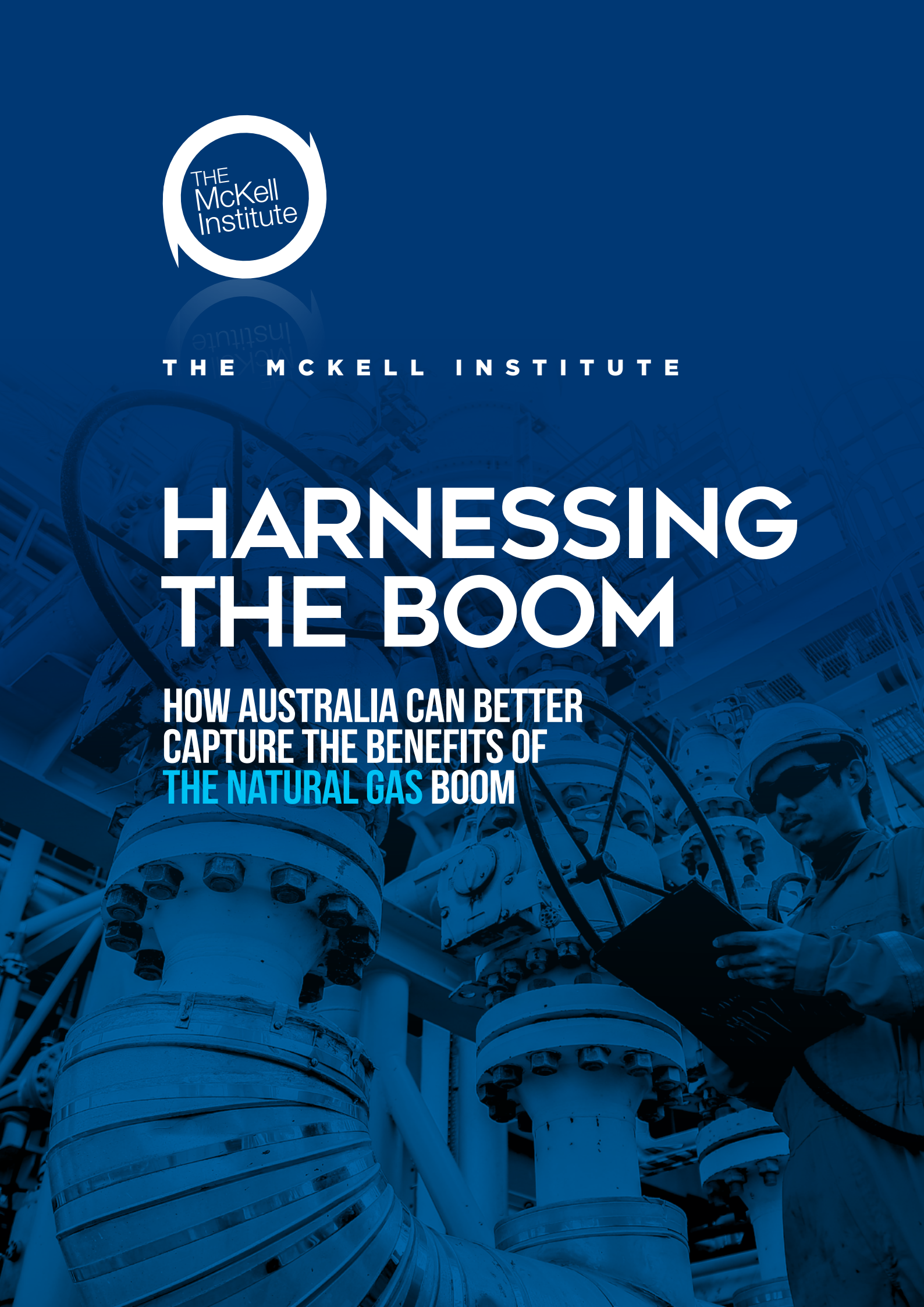
THE McKell Institute

THE MCKELL INSTITUTE

HARNESSING THE BOOM

HOW AUSTRALIA CAN BETTER CAPTURE THE BENEFITS OF THE NATURAL GAS BOOM



ABOUT THE MCKELL INSTITUTE

The McKell Institute is an independent, not-for-profit, public policy institute dedicated to developing practical policy ideas and contributing to public debate. The McKell Institute takes its name from New South Wales' wartime Premier and Governor–General of Australia, William McKell.

William McKell made a powerful contribution to both New South Wales and Australian society through significant social, economic and environmental reforms.

For more information phone (02) 9113 0944
or visit www.mckellinstitute.org.au

BACKGROUND

This report has been funded by the International Transport Workers' Federation (ITF). The authors of this paper have utilised a range of publicly available information and the McKell Institute's own analysis in compiling this paper.

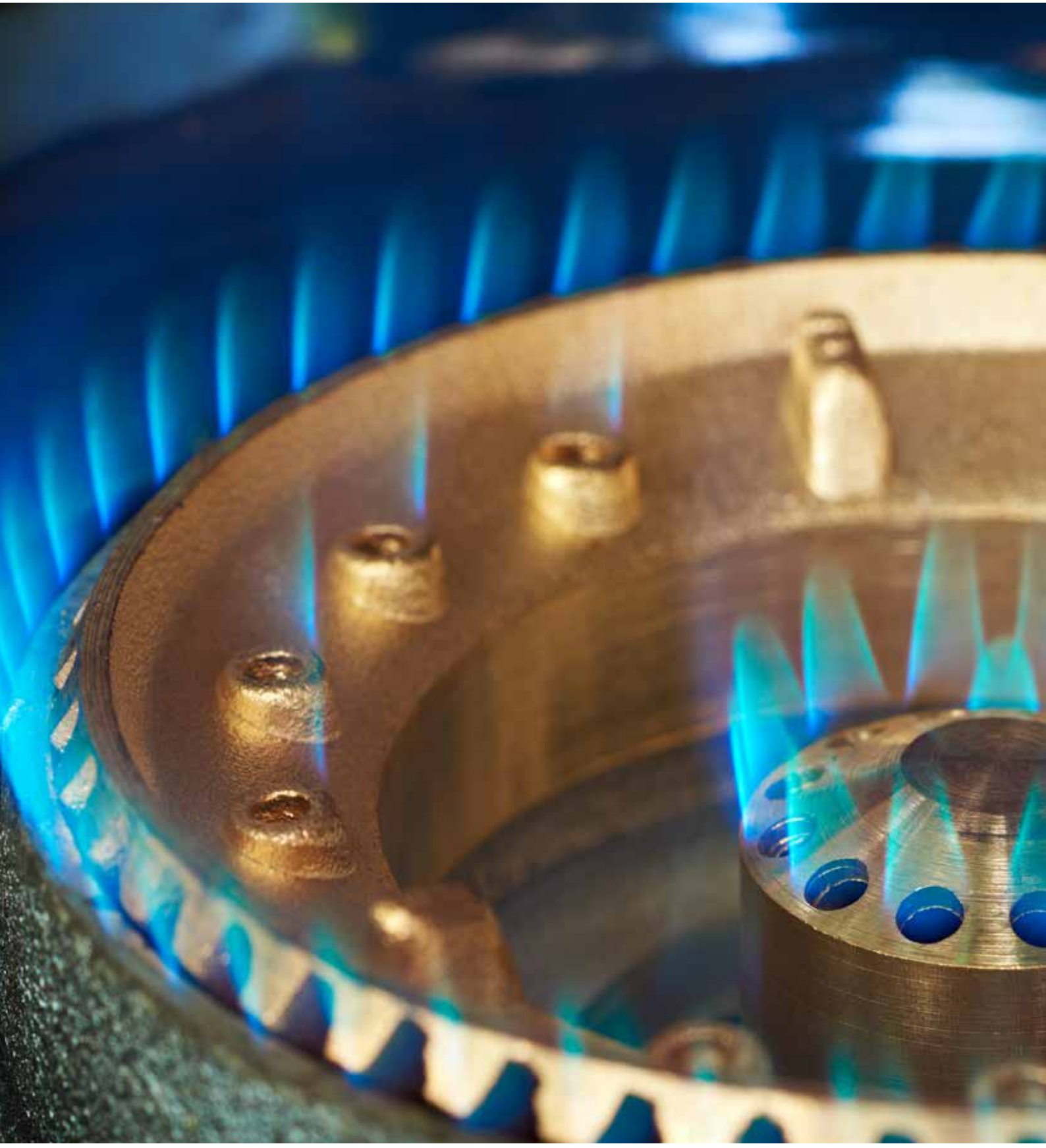
THE MCKELL INSTITUTE

HARNESSING THE BOOM

HOW AUSTRALIA CAN BETTER CAPTURE THE BENEFITS OF THE NATURAL GAS BOOM

MARCH 2017

CONTENTS



AUTHORS

MARIEKE D'CRUZ

Marieke is a former member of the McKell Institute's policy team and has contributed to a wide range of research since 2014.

She holds a Bachelor of Arts with a double-major in International Politics and Media and Communications from the University of Melbourne, and is currently completing a Master of Public Policy at the University of Sydney.

Marieke has also been a professional athlete, having represented Australia at the Olympics, World Championships and Commonwealth Games in swimming; and is currently the President of the Australian Swimmers' Association. Marieke is a contributor to Channel 7's Sunrise program, the ABC, Channel 10 and a regular writer with The Huffington Post.

RICHARD HOLDEN

Richard Holden is a Professor of Economics at UNSW Business School and an Australian Research Council Future Fellow from 2013-2017.

Prior to that he was on the faculty at the University of Chicago and the Massachusetts Institute of Technology. He received a PhD from Harvard University in 2006, where he was a Frank Knox Scholar.

Professor Holden has published in top general interest journals such as the American Economic Review and the Quarterly Journal of Economics.

He is currently editor of the Journal of Law and Economics, and is the founding director of the Herbert Smith Freehills Initiative on Law & Economics at UNSW. He has been a Visiting Professor of Economics at the MIT Department of Economics and Visiting Professor of Law at the University of Chicago Law School.

His research has been featured in press articles in such outlets as: The New York Times, The Financial Times, The New Republic and The Daily Kos. Later in 2016, Professor Holden will be returning to Harvard University as a visiting professor.

FOREWORD

Australia is a country uniquely wealthy in natural resources. Since even before federation, our resource rich continent has been the source of great economic opportunity. From the silver, copper and gold rushes of the mid-19th century to the mining boom of the early 21st century, natural resources have played a pivotal role in the economic development of Australia.

It's not only Australia's vast continental territory that is rich in commodities, but the offshore territory as well. Today, the oil and gas industry see enormous potential in Australia's offshore gas reserves. As global demand for natural gas skyrockets, Australia is well placed to tap into the economic opportunities associated with meeting that demand. Major gas extraction projects are coming online, and the Australian gas industry is set to export more gas than ever to our region and the world.

Indeed, Australia is on the cusp of a gas boom. However, while there are enormous economic opportunities associated with the growth in gas exports from Australia's offshore shelves, these will only benefit the Australian people if the appropriate policy settings are put in place today.

The lesson Australia is still to learn from a long history of resource 'booms' is simple: booms do not last forever, and many of Australia's most valuable natural resources are not renewable. This means that, in order for Australians to truly benefit from the growth in global demand in gas, and the growth in Australia's gas exports, a system must be in place that adequately remunerates the Australian public for the extraction of resources that can never be renewed.

Today, major gas companies are operating under the Petroleum Resources Rent Tax (PRRT) – a form of resource taxation that recognises the unique nature of this industry only by levying a tax on their profits. Simply, many major oil and gas companies operating in Commonwealth jurisdictions do not pay for the actual resources that they are extracting from Australian territory, but are only required to pay a tax on the profits their companies make from the sale of those resources.

We think this is inadequate. Australia's natural resources are the property of the Australian people, and companies that are set to profit from their one-time extraction should fairly compensate the Australian public. At a

state and territory level, and on the North West Shelf, this already occurs in the form of resource royalties – a payment for the resources themselves, and not the profit earned from them. But in other Commonwealth offshore jurisdictions, this is not the case.

This report argues that now is the time to extend a royalty based regime to cover our natural resources in all Commonwealth jurisdictions. The PRRT alone is not delivering: receipts from this system are only set to decline in the years to come, while the extraction of gas is set to rise. The application of a royalty covering resources in Commonwealth jurisdictions is the fairest and most pragmatic way for Australia to make the most of the gas boom it is facing.

This report finds that the extension of a resource royalty covering Commonwealth gas reserves would deliver up to $28.4 billion to the Commonwealth government over ten years, and would be unlikely to deter investment in the gas industry.

Now is the time for the appropriate policy settings to be put in place to ensure Australia can make the most of the gas boom. The application of a Commonwealth resource royalty to all offshore projects is the most effective, equitable and just way of achieving this outcome for the Australian people.

The Hon John Watkins
CHAIR,
MCKELL INSTITUTE

Sam Crosby
EXECUTIVE DIRECTOR,
MCKELL INSTITUTE

EXECUTIVE SUMMARY

Australia is on the cusp of a natural gas boom. The growth in the industry over the last few decades has seen natural gas become Australia's second largest export after iron ore, with hundreds of billions of dollars worth of natural gas set to be exported in the coming decades. But to capitalise on this singular event in the economic history of Australia, an appropriate compensation mechanism must be in place to ensure the Australian economy benefits to the extent it is entitled.

The current mechanism for raising revenue from gas production – the Petroleum Resources Rent Tax (PRRT) – has become increasingly inadequate in delivering economic benefits for the Australian community. While the PRRT aims to protect gas and oil producers from occasional volatility in resource prices, in reality, the PRRT is extremely generous towards major oil and gas companies, who poorly compensate the Australian public for the publicly owned resources they are extracting from the ground, and selling for profit.

Fossil fuel resources in Australia are not renewable: their extraction can only occur once, and it is vital that companies making a profit off this extraction fairly compensate the Australian public for the resource they are depleting. While the major gas and oil companies do pay regular business taxes, they also use the PRRT system to dramatically lower their taxable incomes, and avoid adequately remunerating the Australian people for the use of the gases they extract from Commonwealth territory.

This report outlines the need for the extension of a Commonwealth royalty regime – a payment on the resources extracted, not the profits derived from them – to ensure reasonable remuneration for Australia's natural gas resources extracted from Commonwealth waters by major gas companies.

Resource royalty regimes are already in place at a state level, but have not been implemented consistently at a federal level. This means that some entities involved in the extraction of gas do not reimburse Australia for the natural resources they are extracting and from which they are profiting. Through the implementation of a fair, robust, and more streamlined federal resources royalty regime, this inequitable and unsustainable system can be reformed to deliver better outcomes for the Australian economy, and to generate more revenue for the Commonwealth Government, while maintaining a globally competitive environment for continuing production and future investment.

This report begins by exploring the natural gas industry in Australia, and the opportunities the growing international demand for natural gas brings to the Australian economy - if the appropriate royalty regime is in place. Natural gas accounts for nearly a quarter of global energy production, and with the declining popularity of more pollution-intensive energy sources like coal, this is only set to increase. At the same time, new major gas projects are coming online in Australia, well placed to service this growing global demand.

The next section outlines the inadequate nature of the current taxation arrangements for oil and gas companies in Australia. The existing compensation regime, the PRRT, does not adequately reimburse the Australian people for the resources extracted, delivering only economic returns for the Australian people through taxation on significant profits should they be achieved. And while gas production has increased in recent years, receipts from the

Petroleum Resources Rent Tax have actually decreased.

PRRT receipts are forecast to continue to decline. In 2014-15 the Commonwealth Government received $1.8 billion in PRRT revenue, and this is predicted to fall as low as $0.81 billion by 2020. At the same time, gas and oil companies in Australia are making significant profits, with the industry turning over $67 billion in 2014-15.

Simply, the current system based solely around the PRRT, the system that applies to the majority of projects in Commonwealth waters, results in significant portions of Australia's gas reserves being extracted with no compensation to the Australian owners of these resources. This is unacceptable. The current taxation regime does not deliver equitable remuneration for the extraction of Australia's non-renewable natural resources, and is inconsistent with best practice in other Australian jurisdictions, as well as internationally.

Finally, this report quantifies the benefits to the Commonwealth Government from the extension of a royalty based regime to all projects in Commonwealth waters. This report finds that such a reform could generate up to $11.361 billion in revenue over the four-year forward estimates, or up to $28.4 billion over 10 years. Additionally, the implementation of a royalty based regime would also provide more certainty and predictability regarding future revenue expectations for the government, and remove industry uncertainty over future taxation arrangements.

The current taxation arrangement for companies extracting oil and gas from Commonwealth waters is not delivering the benefit to the Australian economy that it should. It is essential that a Commonwealth royalty based regime is applied equally across the industry to ensure the delivery of better outcomes for the Australian public, fair compensation for the depletion of Australia's non-renewable natural resources, and greater industry certainty in the future.

RECOMMENDATIONS

RECOMMENDATION ONE:
The Australian Government must apply resource royalties to all offshore gas projects

LNG projects located in Commonwealth waters are not subject to any royalties, but are subject to the Petroleum Resources Rent Tax (PRRT). As this report outlines, the PRRT alone is not delivering adequate returns to the Australian public. The introduction of a royalty-based regime is both conceptually more appropriate and economically more beneficial to the Commonwealth, and could deliver up to $11.361 billion in revenue over the four-year forward estimates, or up to $28.4 billion over 10 years.

PART ONE:
THE NATURAL GAS BOOM IN AUSTRALIA

BOX 1

What is natural gas?

Natural gas was formed over millions of years from the remains of plants and animals. Over time, the dead organisms were buried and compressed under thousands of metres of soil and rock, resulting in what we now refer to as fossil fuels. Those fuels comprise oil, coal and natural gas.[1]

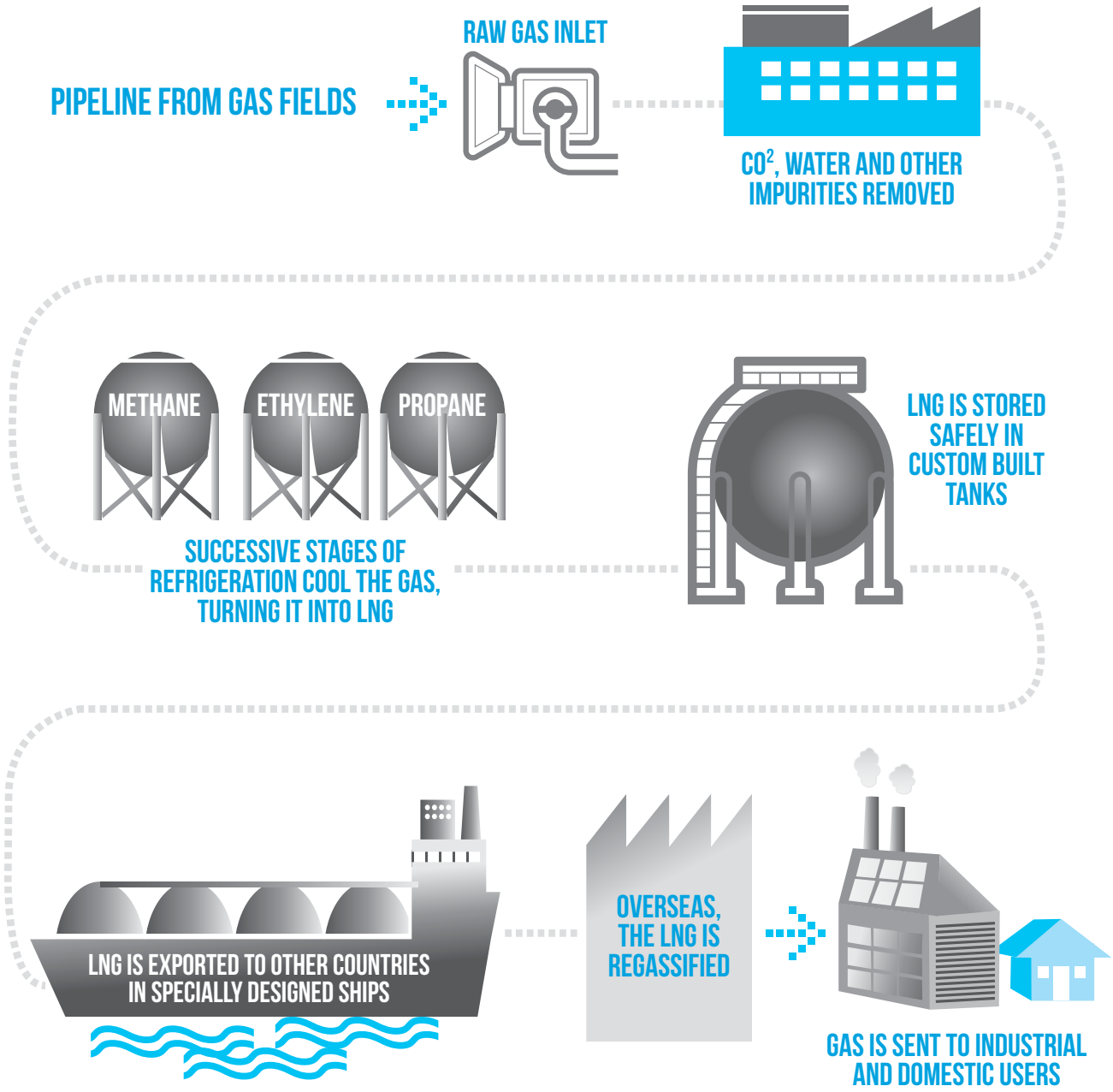
Natural gas is a blanket term for methane, ethane, propane, butane, and some other less common gases that were formed through this process. It is colourless and odourless, and is usually found as a mixture of predominantly methane with smaller amounts of the other gases.

Natural gas is accessed in much the same way as oil: a deep well is drilled thousands of metres into the Earth's crust to release the fossil fuels stored below.[2] Often crude oil or condensate is found along with the gas, which can also be extracted along with water, nitrogen, sulphur or carbon dioxide.[3]

After extraction, the gas must be transported to a facility which can purify it and then cool it to a temperature of around -160 degrees Celsius, in a process called liquefaction. This process reduces the volume of the gas by 600 times, "which is like a beach ball being compressed into a ping pong ball," thereby creating liquefied natural gas (LNG).[4] LNG is easier to transport than its gaseous form, and is also colourless, odourless and non-toxic. The sulphur-like smell of all natural gases is added by producers to make leaks more detectable. Natural gas is extremely flammable, making it both an excellent product for heating and cooking, but also more dangerous and expensive to transport and store.

LNG must be stored in special tanks made of concrete and steel/nickel alloy which keeps it cold for transportation. When it reaches its destination, LNG is then either stored cold or converted back to its gaseous form through a process called regasification and delivered to end users via pipeline.[5]

FIGURE 1.1 The LNG pipeline



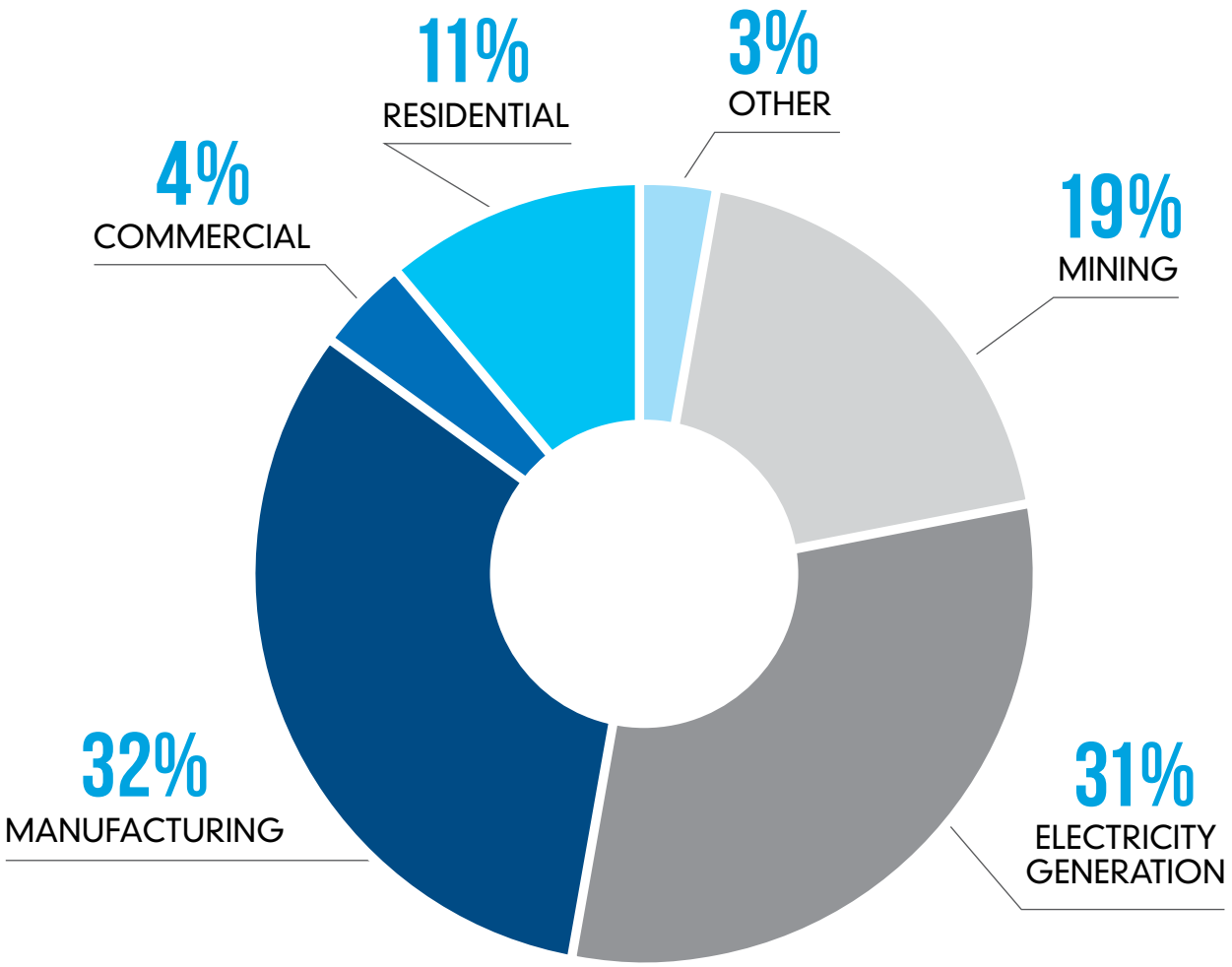
Source: Australia Pacific LNG.[6].

Natural gas is often considered a cleaner alternative to its fossil fuel cousins, oil and coal, as it burns relatively cleanly in comparison. If a leak occurs, the gas will dissipate into the atmosphere rather than collect in dangerous explosive pools like some other gases, or sit on top of the ocean like oil.[7] While the use of gas does contribute to climate change, its adoption is considered by many to be an important step in the long-term transition to a cleaner energy future.

Natural gas is used for a variety of applications

Humans use gas predominately for space and water heating, electricity production, cooking and as a fuel for automotive vehicles. Natural gas is used both in homes and in many sectors of industry, including the chemical, rubber, plastic, paper, metal, vehicle and milk industries.[8]

FIGURE 1.2 Australian gas consumption by sector (2011-2012)



Source: Australian Energy Market Commission, 2017.[9]

Liquid Petroleum Gas (LPG) is the gas that is found in gas bottles used for barbeques and outside heaters, and it is also the alternative fuel for powering motor vehicles. LPG is usually propane or it can also be a propane/butane mix.

LNG consists of methane and is a relatively new product that is mainly used as an alternative to coal for energy production. It is mostly sold to customers requiring large quantities of gas, such as that for industrial processes or energy production. The market for export LNG is relatively small, with just 33 countries importing LNG in 2015. However, this market is growing, as more countries make the transition away from traditional coal-fired power plants.

In the future, natural gas may be used for air

conditioning, as a fuel to replace petroleum in chemical processes producing products like plastics, medicines, paints and pesticides, and in cogeneration projects.

Natural gas for energy production is both cleaner than coal and oil and more reliable than many forms of renewable energy. It is easy to switch gas on and off to meet spikes in energy demand or to fill gaps in energy production, which is why many perceive natural gas as the next step in energy as the world turns away from coal and oil.

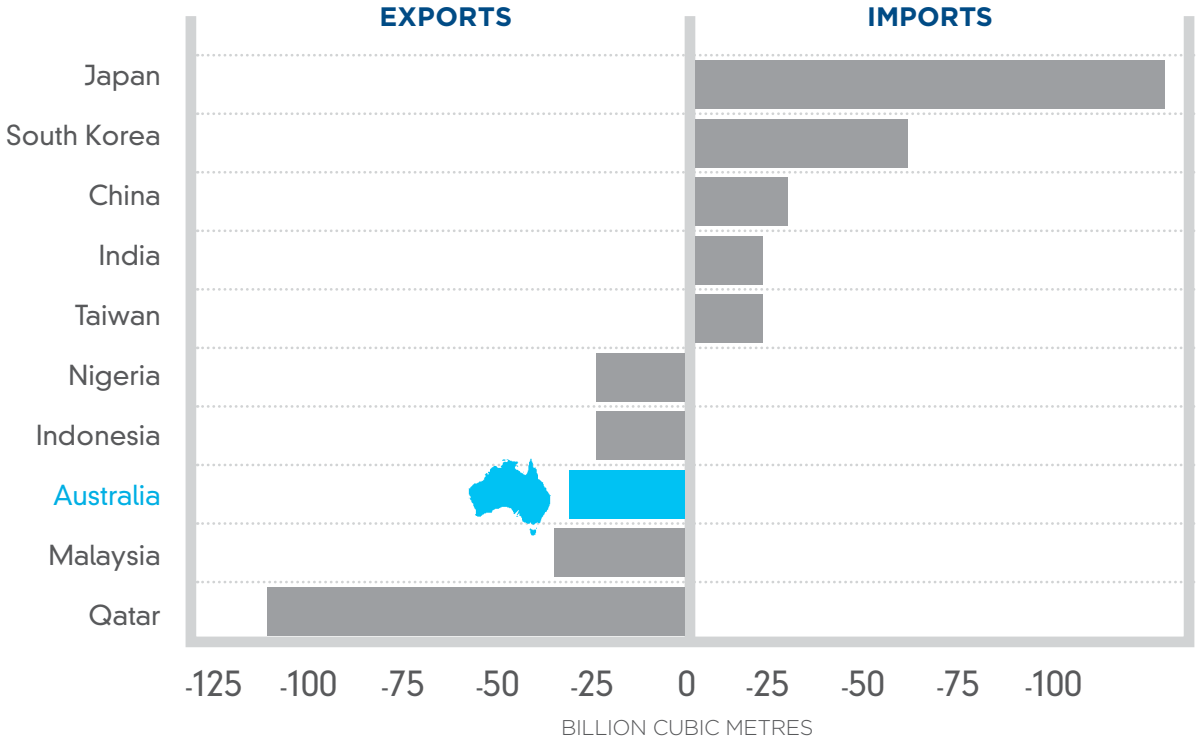
It is for this reason that natural gas consumption has gradually increased to account for around one quarter of global primary energy consumption. North America and Europe are the largest consumers, however, markets in Asia and the Middle East are growing considerably. Particularly in Asia, a greater emphasis on improving air quality and reducing carbon emissions is leading to a higher uptake of natural gas for power production. China recently overtook Japan as the world's largest consumer of natural gas, with consumption increasing almost fourfold over the decade to 2015.

The natural gas boom has begun

The Reserve Bank of Australia estimates that LNG is expected to become Australia's second largest commodity export (after iron ore) in value terms by 2018.[10] Asian consumers are increasingly importing LNG for electricity production, with Japan, China and Korea the largest consumers. Although LNG only represented about 10 per cent of global natural gas consumption in 2015, that figure is expected to increase. Additional supply from large gas projects coming online in Australia is a major factor in this global growth.[11]

In Australia between 2007-2012, eight major liquefaction projects received final funding approval, making it easier for Australia to export LNG to trading partners. The majority of Australian LNG currently goes to Japan (80 per cent); with the remainder shared relatively equally between China and South Korea.[12] However, over the next few years to 2020, the share of exports will increasingly go to China and other smaller regional trading partners, including Malaysia, India and Taiwan.[13]

FIGURE 1.3 Recent patterns of global LNG import and export countries



Source: Source: RBA 2015.[14]

Australia currently has seven LNG plants that are operational, with another three to begin producing within the next two years. The oldest is the North West Shelf venture, which is a joint venture between major partners Woodside, BHP Billiton, BP, Chevron, Shell and MIMI. The North West Shelf venture has been exporting cargoes of LNG since 1989.[15] Darwin LNG has been operational since 2005. The remainder have only been functioning since 2012 or more recently. Figure 1.4 displays Australia's LNG projects, production capacity in million tonnes per annum (mtpa), and owners.

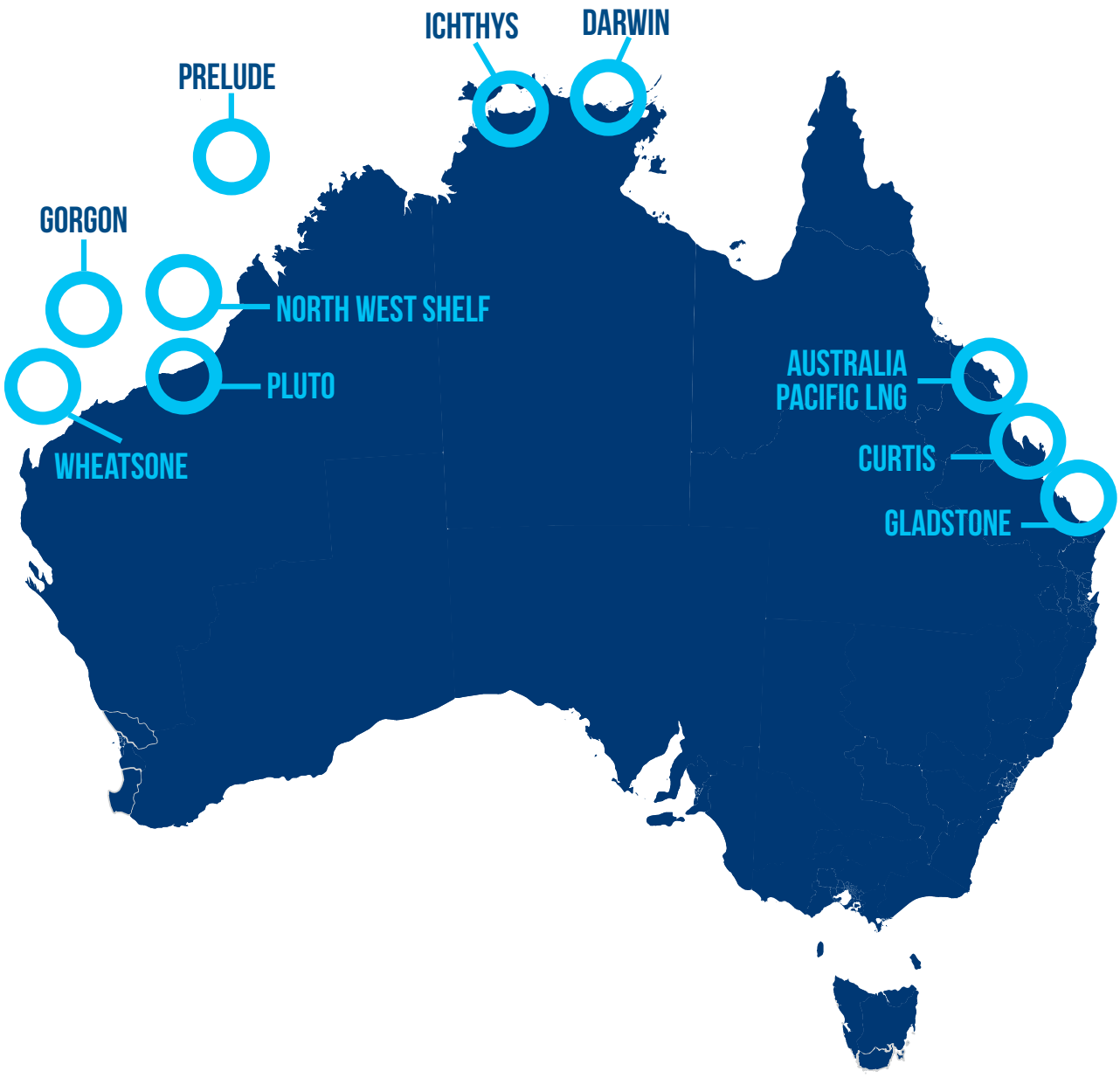
FIGURE 1.4 Australia's LNG projects and owners

Project	Location and details	Production start date	Production capacity	Major owners
North West Shelf	Offshore northwest coast of WA; pipes gas to WA for domestic use and has exported LNG to Asia Pacific region since 1989	**1984**	**16.3 mtpa**	**Woodside, BHP Billiton, BP, Chevron, Shell, MIMI**
Darwin LNG	Onshore, liquefaction facilities in Darwin with gas piped from Timor Sea	**2005**	**3.7 mtpa**	**ConocoPhillips, Inpex, Eni, Santos, Tokyo Electric, Tokyo Gas**
Pluto	Offshore, south of North West Shelf	**2012**	**4.3 mtpa**	**Woodside, Kansai Electric, Tokyo Gas**
Queensland Curtis LNG	Curtis Island near Gladstone, QLD – world's first CSG-LNG facility pipes gas from western Queensland	**2014**	**8.5 mtpa**	**Shell, CNOOC**
Australia Pacific LNG	Onshore coal seam gas (CSG) from Bowen and Surat Basins to LNG facility on Gladstone's Curtis Island	**2015**	**9 mtpa**	**Origin Energy, ConocoPhillips, Sinopec**
Gladstone LNG	Onshore CSG to LNG – pipes gas from Bowen and Surat Basins to Gladstone for liquefaction and export	**2015**	**7.8 mtpa**	**Santos, Petronas, Total, Kogas**
Gorgon	Offshore northwest of Karratha, WA. Gorgon is one of the largest natural gas projects in the world and largest single resource development in Australia's history	**2016**	**15 mtpa**	**Chevron, ExxonMobil, Shell, Osaka Gas, Tokyo Gas, JERA**
Wheatstone	Will pipe gas from offshore in the Carnarvon Basin to near Onslow in WA's Pilbara region	**mid-2017**	**8.9 mtpa**	**Chevron, Apache, KUFPEC, Woodside, Kyushu Electric Power Company, PE Wheatstone Pty Ltd**
Ichthys	Will pipe gas from fields off WA coast to Darwin for liquefaction. Will also produce up to 100,000 barrels of condensate (light oil) per day	**2017**	**8.4 mtpa**	**Inpex, Total**
Prelude	200km off WA northwest coast – will be world's first floating LNG project	**2018**	**3.5 mtpa**	**Shell**

Source: McKell Institute; APPEA 2016.
Note: 'mtpa' is million tonnes per annum; CSG is coal seam gas; LNG is liquefied natural gas.

Figure 1.5 shows a map of where Australia's LNG projects are located. As can be witnessed, the bulk of Australia's LNG projects are based off the coast of Western Australia. The Ichthys facility, which is due to begin producing oil and gas later in 2017, will extract from fields off the coast of Western Australia and pipe the gas to Darwin for liquefaction.

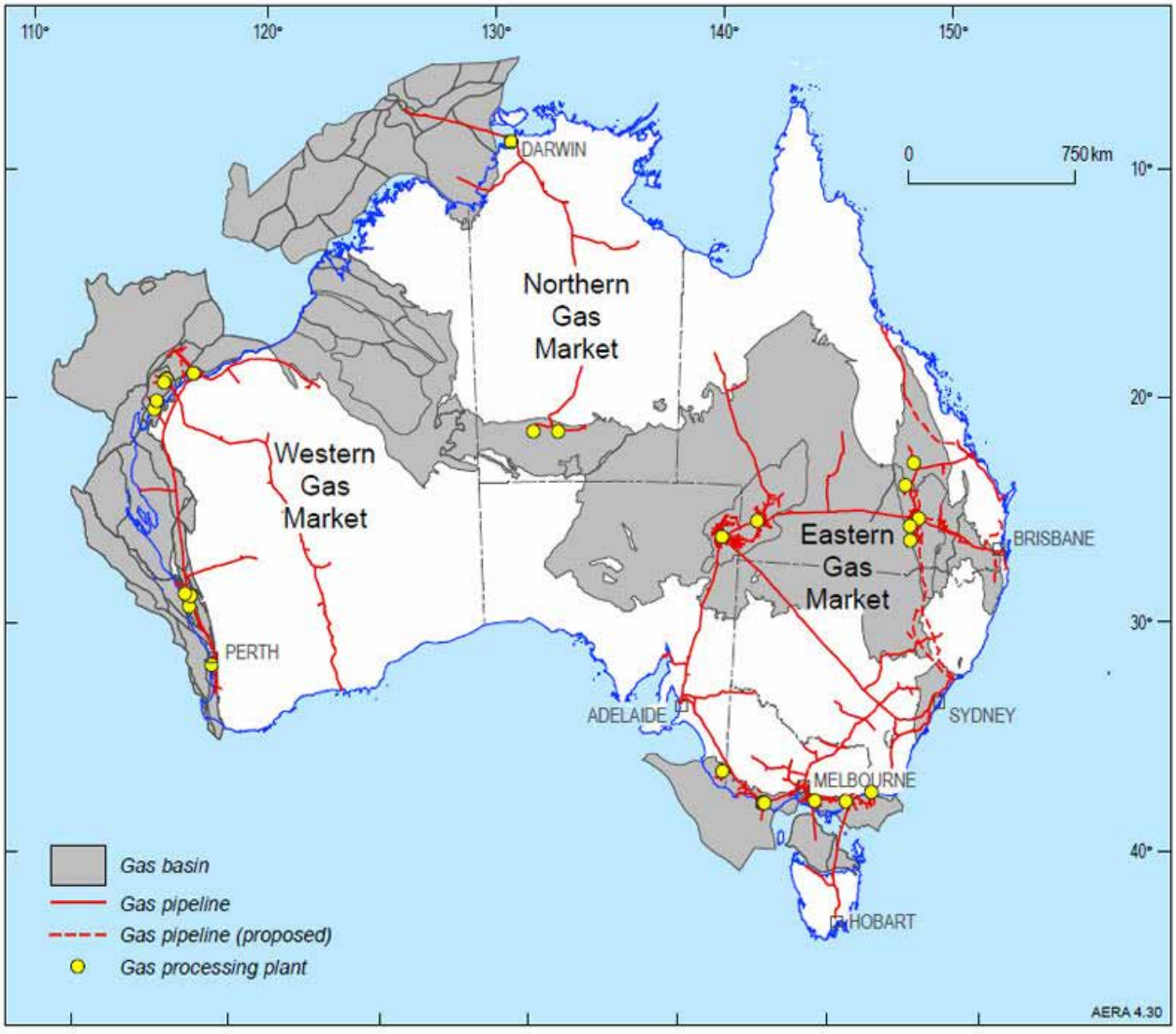
FIGURE 1.5 Australia's LNG projects



Source: Source: RBA 2015

Western Australia's LNG production is currently 'islanded' from the rest of Australia due to the lack of pipelines connecting the state with the east coast markets. As such, the majority of WA production is destined for export markets in Asia and further afield.[16] The east coast market is mainly serviced by producers in Queensland, South Australia and off the Victorian coast and piped through an extensive pipeline to consumers.

FIGURE 1.6 Australian natural gas reserves



Source: Australian Government, Geoscience Australia.[17]

The investment boom in LNG projects over the past decade is a result of a global shortage in LNG – particularly in the Asia Pacific region - during the boom years of the early 2000s.[18] More than $200 billion has been invested in seven LNG projects since then, which will see Australia's LNG exports overtake coal to become our second-largest export in value terms by 2018. It will also see Australia export more LNG than Qatar, which is currently the world's largest exporter, by 2020.[19]

To contrast the size and scope of these projects, the Snowy Mountains hydroelectric scheme, which took 25 years to build and is one of the largest and most complex hydro-electric schemes in the world, cost about $10 billion in today's dollars;[20] whereas any one of the seven new LNG projects cost at least $25 billion, and Chevron's Gorgon cost $50 billion to build.[21]

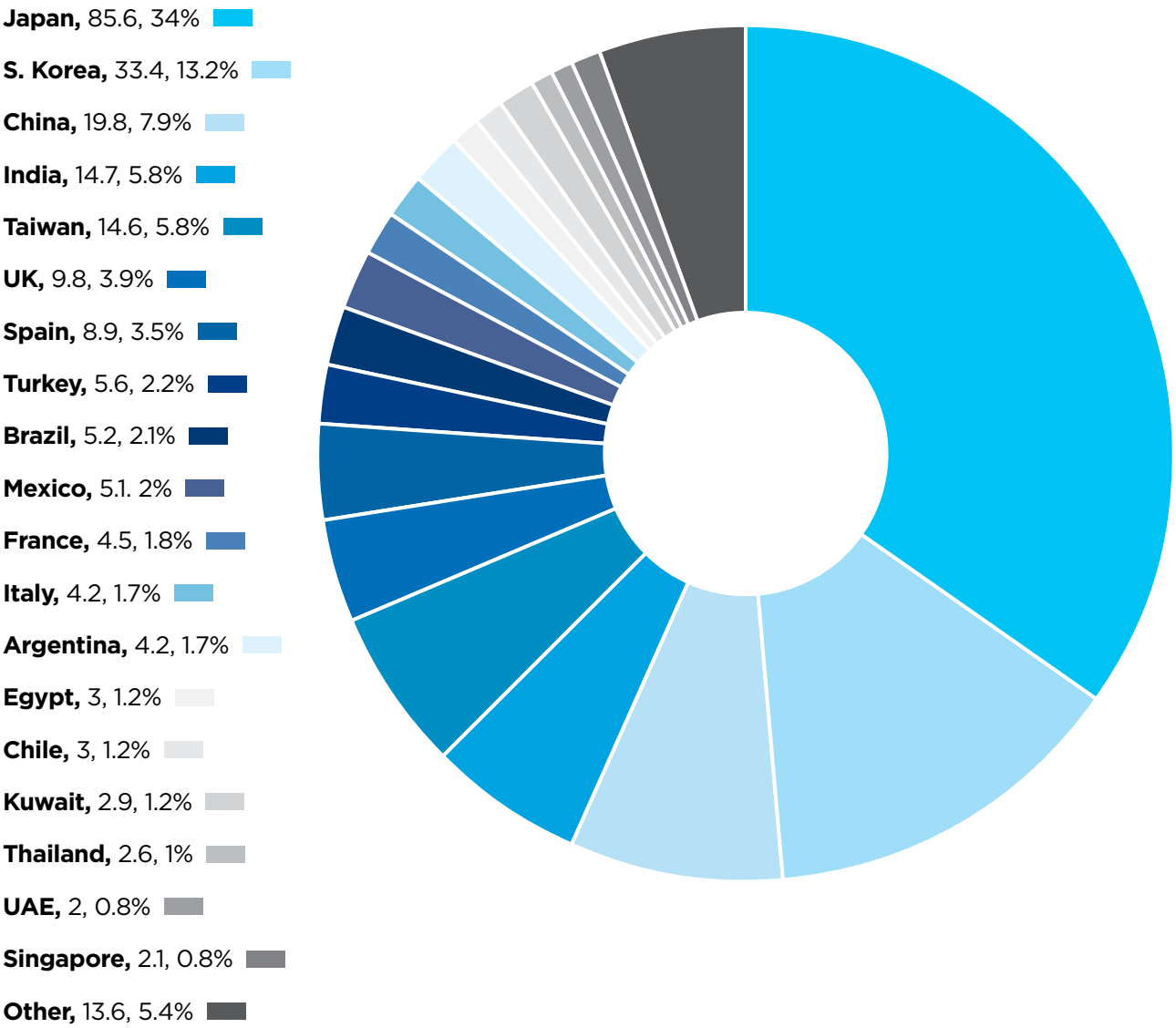
Energy consultants Douglas-Westwood predict that although there is a now an oversupply of LNG in global markets, driven primarily by large Australian projects like Gorgon coming online over the past two years, the longer term outlook for LNG is strong. The Chinese Government's commitment to switching energy production from coal to gas-fired power plants is expected to continue, and other smaller Asian nations are expected to begin using gas for electricity production in greater numbers as well.[22]

Despite subdued prices, the National Australia Bank forecasts LNG exports from Australia to be worth over $27 billion in 2017, rising to $35 billion in 2018, and contributing 1.0 per cent and 0.3 per cent to annual real GDP growth respectively.[23]

Additionally, although the global market is relatively small for LNG, it is growing. There were 33 countries in 2015 that imported LNG, after four new nations – Jordan, Pakistan, Poland and Egypt – began importing gas during the year.[24] Figure 1.7 displays the largest import markets for LNG. The Australian Petroleum Production & Exploration Association (APPEA) reports that Australia's main markets for LNG are Japan, China and South Korea; although Taiwan and India are also emerging as major customers.[25]

LNG is expected to continue growing its share of world energy supply to 2020. Currently gas is used to produce 23 per cent of world energy, but by 2020 that figure will reach close to 30 per cent.

FIGURE 1.7 LNG imports and market share by country (in million tonnes per annum)



Source: International Gas Union 2016.[26]

Note: Number legend represents total imports in MT, followed by market share %. "Other" includes countries with imports less than 2.0 MT: Belgium, US, Jordan, Malaysia, Puerto Rico, Portugal, Pakistan, Dominican Republic, Netherlands, Canada, Greece, Lithuania, Israel and Poland.

While Australia's LNG industry is set to take off during the next few years, our resource taxation settings are unlikely to collect revenue from the gas boom. The next section will discuss Australia's taxation and royalty settings for the oil and gas industry, and show that, unless urgent action is taken, the Australian people can expect to receive little benefit from the natural gas boom that is already upon us.

Gas reservation is needed in Australia

The LNG export boom is not delivering its full economic potential.

92 per cent of the world's gas is controlled by governments or state owned enterprises. The remaining 8 per cent is in Australia, the US and Canada.

Australia stands alone as the one country that allows the unfettered export of gas without consideration of the domestic impacts.

Once fully operational, only 18 per cent of Australia's gas will be extracted by Australian owned firms (including BHP which is only 58 per cent Australian owned).

The simultaneous onset of multiple gas export facilities on the east coast has placed large pressure on prices. The demand for export dwarves the outlook for domestic demand and will see LNG exports account for nearly 75 per cent of total gas demand by 2021.

As a result of these LNG trains, Australia's previously regional gas market has been linked to the Asian and global markets. Australia is now experiencing domestic gas price inflation with associated negative consequences for the energy market and an erosion of national and industry competitiveness. Price increases are having serious consequences for high-energy users, particularly heavy manufacturers.

Australian businesses are impacted by rising gas prices

Recent media reports have shown that the predicted gas crunch has arrived and in many cases is more severe than earlier predictions. The problem is set to worsen into 2018 and 2019 as contracts expire and renegotiations commence.

Recent reporting has indicated that gas users are facing spot prices of $20 (up from a traditional $3-4) a gigajoule, with many manufacturers unable to lock in any form of longer-term contract.

A report by BIS Shrapnel concluded that one in five heavy manufacturers are set to close as result of surging gas prices. The same report concluded that 235,000 jobs and $101 billion in economic activity were at risk.[27]

Domestic gas reservation can play key role in meeting the energy generation gap as Australia transitions to a renewable energy economy, but future domestic supply needs to be guaranteed in order to protect consumers and businesses from higher prices.

A gas reservation policy should be considered

In order to ensure future gas demand is able to be met within Australia, this report recommends the renegotiation of gas export quotas and contracts to deal with the current shortages and price hikes.

Domestic gas supplier AGL and Credit Suisse have called on a restriction of exports to deal with over commitments to export and undersupply of the domestic market.

AGL have predicted that during winter there will be shortages for households and industry. Surging prices have the potential to worsen so called 'energy poverty' for lower income households and pensioners. These factors must be considered when debating reform to the sector.

PART TWO:
RESOURCE TAXATION AND ROYALTIES FOR OIL AND GAS

Resource royalties are an essential part of resource taxation

Resource royalties are a compensation to the community for the depletion of non-renewable resources. Specifically, royalties are collected on behalf of both the current and future generations of a nation, for the privilege of reaping the rewards of commonly-owned, non-renewable resources.[28]

When the Australian Government approves applications for mining or oil and gas projects, it gives companies the right to extract and develop fossil fuels and to derive a profit from doing so. Like all Australian companies and individuals, the company is still liable for income and consumption taxes; but because the non-renewable resources rightfully belong to the Australian people, a royalty must be paid to the Government in exchange for the resource.

The Petroleum Resource Rent Tax is a special kind of tax that is levied on economic rents. It is a recognition that the volatile nature of commodity prices sometimes generates surplus profits on commonly-owned natural resources, for reasons unrelated to the company's own activities. The rent allows both the public and the company to receive a benefit from the surge in profits, without undermining the company's ability to recoup their expenses involved in developing the resource.

> "It is calculated as the margin realised after netting off from the gross mineral revenue all the costs of production (recurrent and capital recovery costs) as well as a minimum return on capital high enough to attract capital and retain it in the project. This minimum required return on capital, termed 'normal profit', compensates investors for foregoing the next best alternative investment opportunities, as well as for the timing and risk of the uncertain cash flows expected from the project."[29]

In 2012, the PRRT was expanded to cover all onshore and offshore oil and gas projects in Australia in order to capture a percentage of 'super profits' when realised by oil and gas companies. However, while all onshore mining, oil and gas projects pay a royalty to the relevant state government, offshore oil and gas projects other than the North West Shelf do not pay any royalties.

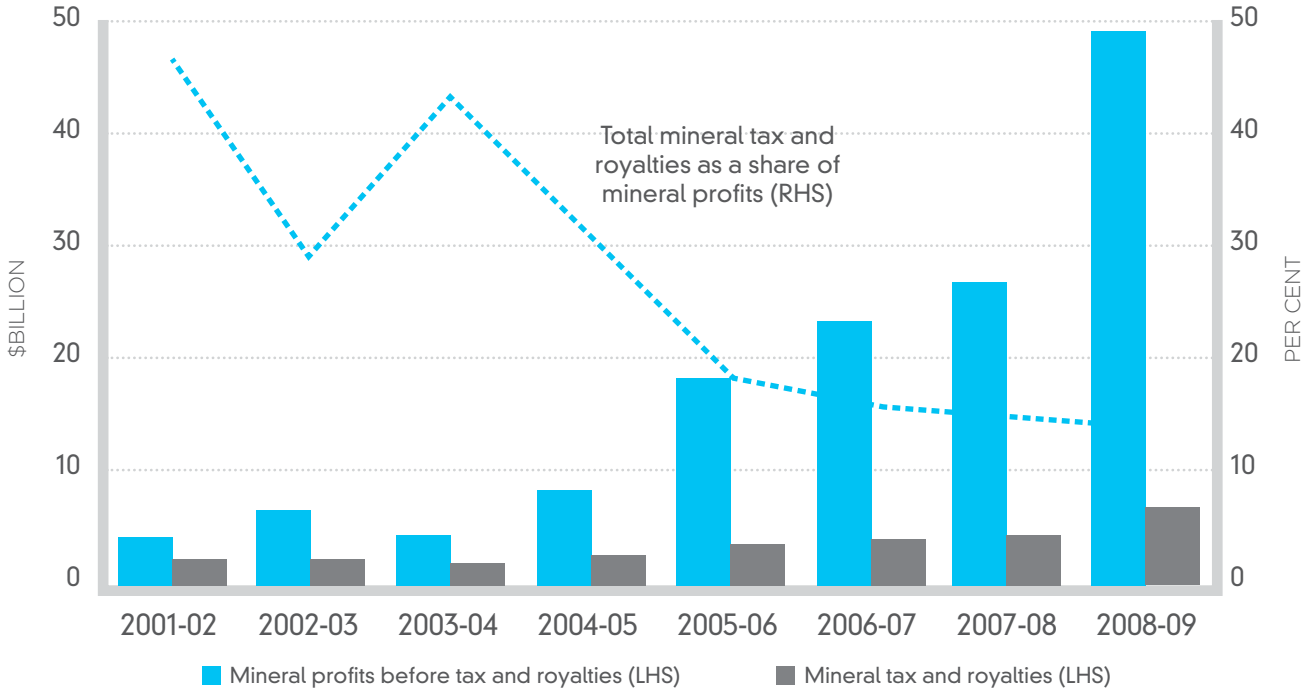
In Queensland, which is the home of the majority of onshore coal seam and shale gas reserves, the royalty equals 10 per cent of the wellhead value* of the petroleum or gas product at the time it is disposed of (which means when it is sold, used, vented or transferred to another person or entity).[30] The average across the states is 10 per cent of wellhead value,* except for Victoria which will charge a smaller 2.75 per cent for coal seam gas if the present moratorium on its extraction is lifted (but 10 per cent for petroleum and conventional gas).[31]

In contrast, offshore facilities sit in Commonwealth waters and out of the jurisdiction of state governments. It is therefore the Federal Government's responsibility to collect royalties for offshore projects. However, it currently only exercises this right with respect to the North West Shelf, and does not impose any royalties on these other offshore schemes.

Australia's taxation arrangements for oil and gas projects are inefficient

In 2010, the Australia's Future Tax System report found: "Australia's current resource charging arrangements and the mechanisms for allocating exploration permits distort investment and production decisions, further lowering the community's return from the exploitation of its non-renewable resources."[32] As an example, Figure 2.1 shows the share of profits the Australian public received during the recent mining boom.

FIGURE 2.1 Australia's share of mineral profits during the mining boom



Source: Australian Government 2010.[33]

* 'Wellhead value' refers to the price charged by the producer of petroleum or natural gas after transportation and other associated costs are factored in.

This is further witnessed through the construction of three separate LNG plants on Gladstone's Curtis Island which have all started production since 2014. The facilities are owned by different companies and all transport coal seam gas in separate pipelines from the Surat and Bowen Basins in western Queensland to Curtis Island for liquefaction and export.[34] The owners of the three separate facilities receive generous uplift rates for construction and operational expenses. If one larger facility and pipeline had been built instead of three, efficiencies could have been found leading to lower expenses for the companies, and a higher taxation revenue for the Government.

FIGURE 2.2 Curtis Island LNG facilities

Source: Source: LNG World News 2015.
Note: Arrow LNG is still going through an approval process, but as yet has no dedicated terminal from which to export LNG.

Further, a recent National Australia Bank report found that the three LNG facilities on Curtis Island ran well under capacity during 2016, raising concerns that the operators of the plants will find it difficult to secure economical natural gas for liquefaction in the future. As a result, Santos, which operates the Gladstone LNG plant, recorded a $1.5 billion write-down of its terminal in the last financial year.[35] This distortion of the market through an overly generous PRRT has led to the oil and gas industry in Australia building up more than $238 billion in deductions on the PRRT scheme.

The Federal Government doesn't collect any royalties on new offshore oil and gas projects

The Federal Government does not currently collect a resource royalty on any of the new major offshore projects. The North West Shelf is a fully-mature project that began extracting oil in 1984 and exporting LNG in 1989. The Federal Government collects a 10 per cent royalty on the wellhead value for primary production licences and an 11 or 12.5 per cent royalty for secondary production licences, of which about two thirds is given to the Western Australian State Government and the remainder goes to the Federal budget. The only other offshore project the Government receives royalties from is the Joint Petroleum Development Area which is shared with Timor Leste.[36]

Royalties for mining, oil and gas are usually collected by state governments in Australia, and up until recently, that system has worked well. However, since the construction of seven new LNG facilities in Commonwealth waters during the past five years, and the realisation that the PRRT may not produce revenue for the Government from LNG for decades, it is clear that reform must take place.

Figure 2.3 is a summary of the resource tax and royalty regimes currently applying to each oil and gas region in Australia.

FIGURE 2.3 Summary of tax regimes applicable to each oil and gas region in Australia

Project	PRRT	Excise	State Royalties	Commonwealth Royalties	Resource Rent Royalty (RRR)
Commodities	Any naturally occurring hydrocarbon (or naturally occurring mixture of hydrocarbons), whether in gaseous, liquid or solid state. Includes oil shale.	Crude oil and condensate.	Any naturally occurring hydrocarbon (or naturally occurring mixture of hydrocarbons), whether in gaseous, liquid or solid state.[a]	Any naturally occurring hydrocarbon (or naturally occurring mixture of hydrocarbons), whether in gaseous, liquid or solid state.	Any naturally occurring hydrocarbon (or naturally occurring mixture of hydrocarbons), whether in gaseous, liquid or solid state. Excludes oil shale.
Onshore [b]	Yes (since 1 July 2012)	Yes	Yes	No	Barrow Island only
Offshore	Yes (since 1988)	North West shelf only	No	North West shelf only	No
North West Shelf (special offshore area)	Yes (since 1 July 2012)	Yes	No	Yes. Shared with Western Australia [c]	No
Barrow Island (special onshore area)	Yes	No (replaced with RRR)	No (replaced with RRR)	No (replaced with RRR)	Yes (since 1985) [d]
Bass Strait (offshore)	Yes (since 1990-91)[e]	No	No	No	No

(a) Slight variations across states.
(b) Including within three nautical miles of the Australian coastline. The Commonwealth is also entitled to 40 per cent of royalties obtained by Western Australia from petroleum developments derived from pre-1979 leases which are located in the coastal waters region adjacent to Western Australia.
(c) These royalties are shared with Western Australia according to the formula set out in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 — Section 75* (approximately one third to the Commonwealth, two thirds to Western Australia).
(d) Shared between the Commonwealth and Western Australia 75:25.
(e) Production in Bass Strait changed from a royalty/excise regime to PRRT in 1990-91.

Source: Australian Government 2016.[37].

The PRRT extension in 2012 was in part intended to streamline resource taxation and royalty regimes as applied to onshore and offshore oil and gas projects in Australia. However, as will be shown in the next section, it has failed to collect appropriate revenue from the projects' multinational owners.

The Petroleum Resource Rent Tax is extremely generous to oil and gas companies

The Petroleum Resource Rent Tax (PRRT) is the primary resource tax levied on oil and gas projects in Australia. It is a profit-based tax which applies to the extraction of all petroleum projects, including crude oil, natural gas, liquid petroleum gas (LPG), condensate and ethane. PRRT is not imposed upon the Joint Petroleum Development Area, which Australia shares with Timor Leste; or on value-added products such as liquefied natural gas (LNG).[38] Since 1 July 2012, the PRRT has been applied to all onshore and offshore oil and gas projects, including the North West Shelf, as well as all of the onshore oil shale and coal seam gas projects.[39]

The PRRT is imposed at a rate of 40 per cent to oil and gas profits after all allowable deductions from project and exploration expenditures have been made.[40] The Australian Government states that the "PRRT provides a fiscal regime that encourages the exploration and production of petroleum while ensuring an adequate return to the community."[41]

Deductions for exploration expenditures are calculated by adding the exploration expenditures and 15 percentage points above the long term bond rate (for 2016 that equalled 17.61 per cent).[42] Other expenditures (such as capital and operating expenditures) may also be deducted from taxation liabilities at a rate of the expenditure plus five percentage points above the long term bond rate (7.61 per cent for 2016).[43] These rates are called the 'uplift' rate, which means that the carry-forward expenditure grows by the uplift rate every year and is deducted against future revenues.

Deductions can also be made across different projects if the projects are owned by the same company group. Further, "exploration expenditure in areas designated as frontier between 2004 and 2008 are eligible for 150 per cent uplift under the PRRT."[44]

It is because of these uplift rates and the ability for oil and gas companies to defer deductions to future tax years that the industry has built up more than $238 billion in deductions. These tax credits grew by $50 billion from 2014-15 to 2015-16 alone.

Put simply, this means that the industry will need to record at least $238 billion in profits before a cent in royalties is paid to the Australian people, who are the rightful owners of the oil and gas resources. Wood Mackenzie modelling commissioned by the oil and gas industry lobby group, APPEA, shows that at current oil prices, there is no government revenue at any point in the future from PRRT on these new LNG projects.

As Ken Henry and his colleagues wrote in 2010's Australia's Future Tax System report, "Although the current PRRT collects a more stable share of rents in varying economic conditions, it fails to collect an appropriate and constant share of resource rents from successful projects due to uplift rates that over-compensate successful investors for the deferral of PRRT deductions."[45]

PRRT receipts are falling despite increasing production

In 2007, Chevron, a part owner in the North West Shelf, Wheatstone and the enormous Gorgon LNG project made the claim that government revenues from the Gorgon project alone "would generate so much wealth it could allow the government to cut personal income taxes."[46] The company predicted it would pay $338 billion in taxes to the Government by 2040. However, ten years later the Government is staring down the barrel of decades of LNG profits without seeing a single cent from the industry in PRRT revenue.

PRRT receipts from long standing projects like oil from the Bass Straits have been falling and are forecast to continue falling. In 2014-15, $1.2 billion was paid by the oil and gas industry in PRRT, even though total reported revenues for the five largest companies was $67 billion. Despite oil and gas production predicted to nearly triple in the next four years, the Treasury's forecast PRRT receipts from all projects combined are expected to remain at an average of $800 million per annum.

FIGURE 2.4
PRRT revenue from entire oil and gas industry 2011 to 2020 (projected)

Financial year	Value (billions A$)	PRRT revenue (billions A$)
2011-12	11.95	1.58
2012-13	14.27	1.27
2013-14	16.31	1.77
2014-15	17.14	1.80
2015-16	17.97	0.84
2016-17	22.31	0.85
2017-18	32.76	0.78
2018-19	38.33	0.79
2019-20	40.63	0.81

Source: Australian Government 2016.

As resource royalties (paid on onshore projects and the North West Shelf) are deductible on company tax, there are some large multinational companies that have avoided paying any tax to the Federal Government for the previous two financial years. Two companies, Chevron Australia (part-owner of North West Shelf, Wheatstone and Gorgon) and ExxonMobil Australia (part-owner of Gorgon) paid no corporate income tax at all for the 2014-15 financial year, nor did they for the previous year. Figure 2.5 displays figures reported by the Australian Taxation Office for financial years 2013-14 and 2014-15 for the five largest oil and gas companies in Australia.

FIGURE 2.5

Australian Taxation Office reported corporate income tax for Australian oil and gas companies 2013/14-2014/15

Name	Total income $	Taxable income $	Tax payable $
2014-15			
BP Regional Australasia Holdings Pty Ltd	28,527,387,997	1,138,672,280	234,113,661
Chevron Australia Holdings Pty Ltd	3,088,416,159	0	0
Exxonmobil Australia Pty Ltd	8,464,272,972	0	0
Shell Energy Holdings Australia Ltd	18,449,928,728	4,188,252,139	1,028,943,536
Woodside Petroleum Ltd	8,460,295,354	3,608,969,932	810,889,738
TOTAL 2014-15	**66,990,301,210**	**8,935,894,351**	**2,073,946,935**
2013-14			
BP Regional Australasia Holdings Pty Ltd	28,217,272,718	1,863,095,424	515,344,160
Chevron Australia Holdings Pty Ltd	3,031,734,021	0	0
Exxonmobil Australia Holdings Pty Ltd	9,617,324,823	0	0
Shell Energy Holdings Australia Ltd	24,786,263,303	1,237,809,737	87,572,000
Woodside Petroleum Ltd	6,295,214,633	1,181,453,996	326,754,680
TOTAL 2013-14	**71,947,809,498**	**4,282,359,157**	**929,670,840**

Source: Australian Taxation Office 2016.

Additionally, just five per cent (8) of the 149 oil and gas projects operating in Australia pay any PRRT.[47] Figure 2.6 displays the amount of PRRT paid by the industry for the past two reported financial years.

FIGURE 2.6
PRRT paid by Australian oil and gas companies 2013/14 and 2014/15

Name	Tax payable $
PRRT information for 2013-14	
NAME	PRRT PAYABLE $
AWE (Offshore PB) Pty Ltd	5,315,502
AWE Oil (Western Australia) Pty Ltd	5,358,875
BHP Billiton Petroleum (Australia) Pty Ltd	381,369,378
BHP Billiton Petroleum (Bass Strait) Pty Ltd	559,866,686
BHP Billiton Petroleum (Victoria) Pty Ltd	26,555,124
Esso Australia Resources Pty Ltd (ExxonMobil)	538,485,033
Mitsui E&P Australia Pty Ltd	63,010,702
Peedamullah Petroleum Pty Ltd	5,508,558
Roc Oil (WA) Pty Ltd	10,493,858
Talisman Oil & Gas (Australia) Pty Ltd	9,099,656
Vermilion Oil & Gas Australia Pty Ltd	75,117,597
Woodside Energy Ltd	85,795,767
TOTAL PRRT COLLECTED BY GOVERNMENT	**$1,765,976,736**
PRRT information for 2014-15	
NAME	PRRT PAYABLE $
AWE (Offshore PB) Pty Ltd	1,290,297
BHP Billiton Petroleum (Australia) Pty Ltd	340,737,757
BHP Billiton Petroleum (Bass Strait) Pty Ltd	293,921,172
BHP Billiton Petroleum (Victoria) Pty Ltd	28,110,468
Esso Australia Resources Pty Ltd – Bass Strait (ExxonMobil)	265,070,131
Mitsui E & P Australia Pty Ltd	82,422,986
Peedamullah Petroleum Pty Ltd	211,763
Quadrant PVG Pty Ltd	114,654,288
Roc Oil (WA) Pty Ltd	3,727,953
Talisman Oil & Gas (Australia) Pty Ltd	3,471,458
Vermilion Oil & Gas Australia Pty Ltd	36,801,589
Woodside Energy Ltd	31,087,035
TOTAL PRRT COLLECTED BY GOVERNMENT	**$1,201,506,897**

Source: Australian Taxation Office, 2016.

Diane Kraal, a lecturer in taxation at Monash University has said that the PRRT, "which is designed to net 'super-profits' in the more volatile oil market, is overly generous for LNG producers who hold stable, long-term supply contracts but do not experience short bursts of rampant profits."[48] "Because of oil's super-profitability the tax had been effective but is no longer effective."[49] For instance, the PRRT allows the accumulation of tax credits at compound "uplift" rates, so that the industry's existing $238 billion in PRRT credits will continue to grow, offsetting any potential liabilities for decades.[50]

Recent media reports suggest that at current prices, new LNG projects will never pay any PRRT. The West Australian, on 27 February 2017, suggests that Chevron 'will not pay anything for the gas it extracts if current oil prices persist' on the Gorgon project in Western Australia.[51] Examples such as these demand changes to the current system in which PRRT is the only mechanism through which revenue can be captured on major gas projects within Commonwealth waters.

The PRRT does not efficiently capture a fair amount of revenue for the Australian public largely because gas prices are less volatile than oil or the prices of other commodities. Australia's largest customers for LNG: Japan, South Korea and China, tend to sign up for long term purchasing agreements in the order of 15 to 20 years. This sets the price of the LNG in advance, leaving less room for the 'super profits' captured by the PRRT.[52] As of 2015, only about 5 to 10 per cent of Australia's LNG is estimated to be sold on a short-term basis – the majority is sold under long term purchasing agreements. This is not expected to change any time soon because many of Australia's recent projects were funded in part by buyers wishing to secure their LNG supply.[53]

Australia collects less in royalties and resource taxes than other LNG-producing nations

Australia is poised to become the world's largest producer of LNG by 2020, overtaking Qatar to produce more than 85 million tonnes of LNG per year. However, compared to Qatar and the other top LNG producing nations, Australia will collect far less in revenues from royalties and resource taxes. Figure 2.7 displays the top five LNG producing nations in the world in 2014 as well as government revenues. As can be seen, Australia's revenues are far lower than all the other top producers both as a percentage of production volumes and in total value.

FIGURE 2.7

Top five LNG exporters in 2014: Government revenue from oil and gas

Rank among LNG exporters, 2014	Country	Oil and gas production (thousan oil-equivalent barrels)	Government revenues from oil and gas (US $m, 2014)	Government revenues from oil and gas as % production volumes, 2014
1	Qatar	1838018	$88,245.78	4.80%
2	Malaysia	660746	$20,286.24	3.07%
3	**Australia**	**511357**	**$7,275.00**	**1.42%**
4	Nigeria	1104559	$36,952.44	3.35%
5	Indonesia	772666	$25,824.12	3.34%

Source: : ITF 2016.[54].

Within Australia and across the world, royalty rates vary. In the United States, the Federal Government collects 18.75 per cent in royalties on offshore production, but 12.5 per cent on onshore production on Federal lands. In Texas, one of the largest oil and gas producing regions of the world, production on public lands is subject to a 25 per cent royalty. Figure 2.8 notes the various onshore and offshore royalty rates for select Australian, US and Canadian governments.

FIGURE 2.8
Onshore and offshore royalty rates: Australian and selected Canadian and US governments

Onshore and offshore royalty rates: Australian and selected Canadian and US governments

Alberta, Canada	5 to 40%
Victoria, NSW, South Australia, Queensland, Northern Territory	10%
Tasmania	12%
Western Australia	10 to 12.5%
North West Shelf project area	10 to 12.5%
US Federal Government - onshore	12.50%
North Dakota, USA	16.67 to 18.75%
US Federal Government - offshore	18.75%
Texas, USA	25%

Onshore and offshore royalty receipts (US $m 2014): selected Australian, Canadian, US Governments

Western Australia	$7.57
Queensland	$37.87
North West Shelf - grants to Western Australia	$906.55
Australia - PRRT	$1,817.64
US Federal - onshore	$2,735.91
Texas, USA	$5,773.65
US Federal - offshore	$5,923.11
Alberta, Canada	$6,573.09

Source: : Source: ITF 2016.[55].

As can be witnessed, Australia collects far less in revenues than some of its largest competitors. As a result, the Australian people are not collecting a share of the wealth that is generated by multinational oil and gas companies from goods owned by the public.

The International Transport Workers' Federation reports that when Australia overtakes Qatar as the world's largest exporter of LNG in 2020-21, the middle-eastern nation will likely collect $26.6 billion in royalties from LNG production, whereas at current prices, Australia will collect no PRRT from the new LNG projects driving this export boom.[56] This is from a comparable amount of LNG produced in both nations.

The oil and gas industry responds to such forecasts by claiming that Australia is one of the most expensive nations in which to explore for and produce petroleum products. However, industry website Energy News recently reported a conflicting statement by Chevron Australia general manager Gerry Flaherty: "We have competitive shipping and finding costs, terrific reservoirs and can develop them at competitive prices." Mr Flaherty made this statement to the Society of Petroleum Engineers' Asia Pacific Oil & Gas Conference in Perth in relation to Chevron's Western Australian operations in October 2016.[57]

In a time of high government debt and tightening budgets, government revenue is an important topic for discussion. A gas boom in Australia should lead to a fair distribution of wealth amongst both the developing companies and the owners of the resources – the Australian people. However, as has been shown so far, the Australian government will be unlikely to see a cent in PRRT from these new offshore LNG projects.

There are different options for how the Government can mitigate this situation: the simplest is the introduction of a resource royalty, imposed at the wellhead. This option also has the benefit of improving equity amongst all onshore and offshore projects in Australia. The following section will present independent modelling on the introduction of a resource royalty to those offshore oil and gas projects that currently pay no state-based or Commonwealth royalties.

PART THREE:
THE AUSTRALIAN GOVERNMENT MUST APPLY RESOURCE ROYALTIES TO ALL OFFSHORE PROJECTS

> LNG projects located in Commonwealth waters are not subject to any royalties, but are subject to the PRRT. There are two questions that arise from this: (i) is PRRT or a royalty the economically appropriate means of ensuring that the Commonwealth receives compensation for providing a resource it owns; and (ii) what are the expected revenues from a royalty-based regime compared to the PRRT, and how volatile are these revenues.

The following analysis and discussion shows that a royalty-based regime is both conceptually more appropriate and economically more beneficial to the Commonwealth.

In comparing a royalty-based regime with the PRRT there are additional considerations which we do not attempt to model here. Perhaps the two most important such considerations are: (i) what is the impact on future investment; and (ii) what is the impact on public confidence as a result of the expected revenue streams.

Approach to the modelling

Since the revenue generated from a royalty depends on the value of so-called "supply gas" at the wellhead we apply estimates of both the cost of supply and the value created through that supply. The latter depends on the contract price of LNG, as we discuss in more detail below.

We also form a view about the expected revenue from the PRRT. There are a number of ways in which a royalty regime could interact with the PRRT. One option is to remove the PRRT and replace it with a royalty regime. A second is to keep the PRRT, but allow a deduction for any royalty payments made. The latter is consistent with the treatment of existing state-based and Commonwealth royalty regimes. In either case, to reach a net revenue impact from applying a royalty we deduct the potential lost PRRT revenue from the expected royalty revenue.

In order to calculate the expected revenue from a royalty it is clearly necessary to determine the wellhead value of natural gas to which the royalty applies. A central consideration in making this determination is how value is added through the LNG value-chain and what the outside market opportunities for gas at the wellhead is. It is worth reiterating the value-chain involved in getting gas from the field, into a Marketable Petroleum Commodity ("MPC"), and to the final consumer.

As the figure below shows, there are several steps in the value chain, and producers are typically highly vertically integrated. Since value is added at several points in the production process, it is a challenge to determine the exact value of gas at the wellhead. This challenge is exacerbated by the fact that there are often long-term contracts with eventual purchasers of gas—sometimes even involving partial financing of the project.

To understand the true value of gas at the wellhead would require, at a minimum, detailed plant-level accounting data. Even with such data there remains the question of how much value is created by one necessary step in a multi-step production process. If zero value is created without

one step—as is this case with extracting gas from the well—then how much of the total value is due to that step.[58]

We tackle this issue by viewing the wellhead value as cost of supply to LNG processing plant. This is a commonly-used method, whereby one estimates the minimum price for viable supply gas to be generated at the wellhead. To do this, one separates production costs throughout the value chain into costs of production in the upstream and downstream components of the project.

Consistent with the discussion of the multi-step production process above, we assume in our analysis that the value of the supply gas at the wellhead is equal to the LNG sales price minus costs of transportation and liquefaction.

It is this value of supply gas at the wellhead to which the 10% royalty is applied. A 10% rate is selected for maximum consistency across existing Commonwealth and State royalties.

We should emphasise that a very significant proportion of the LNG to be produced from the Australian offshore fields is likely to be under long-term contract. This provides greater price stability and predictability, both for the producers, but also for government royalty receipts.

Based on industry reports and discussions with experts, we assume a relevant benchmark variable cost of producing supply gas of A$4.00 per MBTU.

FIGURE 3.1 Australian LNG projects considered

Project	Location and details	Production start date	Production capacity
Pluto	Offshore, south of North West Shelf	**2012**	**4.3 mtpa**
Gorgon	Offshore northwest of Karratha, WA. Gorgon is one of the largest natural gas projects in the world and largest single resource development in Australia's history	**2016**	**15.6 mtpa**
Wheatstone	Will pipe gas from offshore in the Carnarvon Basin to near Onslow in WA's Pilbara region	**mid-2017**	**8.9 mtpa**
Ichthys	Will pipe gas from fields off WA coast to Darwin for liquefaction. Will also produce up to 100,000 barrels of condensate (light oil) per day	**2017**	**8.4 mtpa**
Prelude	200km off WA northwest coast – will be world's first floating LNG project	**2018**	**3.5 mtpa**

Source: : McKell Institute; APPEA 2016.

An important consideration in determining potential royalty revenues is the capacity utilisation. We have assumed an average capacity utilisation of 95 per cent of nameplate capacity in our base case (90 per cent in the low case and 98 per cent in the high case). This essentially allows for downtime for maintenance, although it is worth noting that several existing Australian LNG plants operate above this level, some at 98-99 per cent.

The other major factor affecting capacity utilisation is the possibility of shutdown (for a period of time) due to low LNG prices. A number of factors suggest that for offshore LNG plants it is somewhat implausible that such a situation would arise. First, offshore LNG plants involve a small number of conventional wells. By contrast, onshore plants typically involve drilling a large number—say in the hundreds—of wells. Thus, for offshore plants, there is essentially no "extensive margin" on the number of wells—they are drilled up front. Second, labour costs are essentially the only variable cost involved at the wellhead. Not shutting down the plant therefore involves the relevant value/price being above labour costs. Much of the labour involved is essentially a fixed cost—at least in the short run—and therefore LNG prices would need to be extremely low for it to make sense to shut down an offshore plant—even for a period of time.

Finally, we conduct analysis of three different scenarios: a base case, a low case, and a high case. These differ according to the price of LNG, the AUD/USD exchange rate, and plant capacity utilisation. Figure 3.2 details these assumptions. In terms of oil prices, the base case of $8 per MBTU translated into approximately US $44 per "barrel of oil equivalent" (BOE). The low case of $6 per MBTU is approximately US $33 per BOE; and the high case of $12 per MBTU is approximately US $67 per BOE.

FIGURE 3.2 Capacity utilisation under three plausible scenarios.

	Base Case	Low Case	High Case
LNG price (USD) per MBTU	$8.00	$6.00	$12.00
AUD/USD fx rate	.750	.850	.650
Capacity utilisation	95%	90%	98%

Source: : McKell Institute; APPEA 2016.

Results show a royalty regime would deliver significant revenue

Under the base case assumptions detailed above, a 10 per cent royalty is expected to deliver annual revenue to the Commonwealth of A$1.269 billion. The more pessimistic low case would deliver an estimated A$551.7 million annually, and the more optimistic high case would deliver an estimated A$2.840 billion annually.

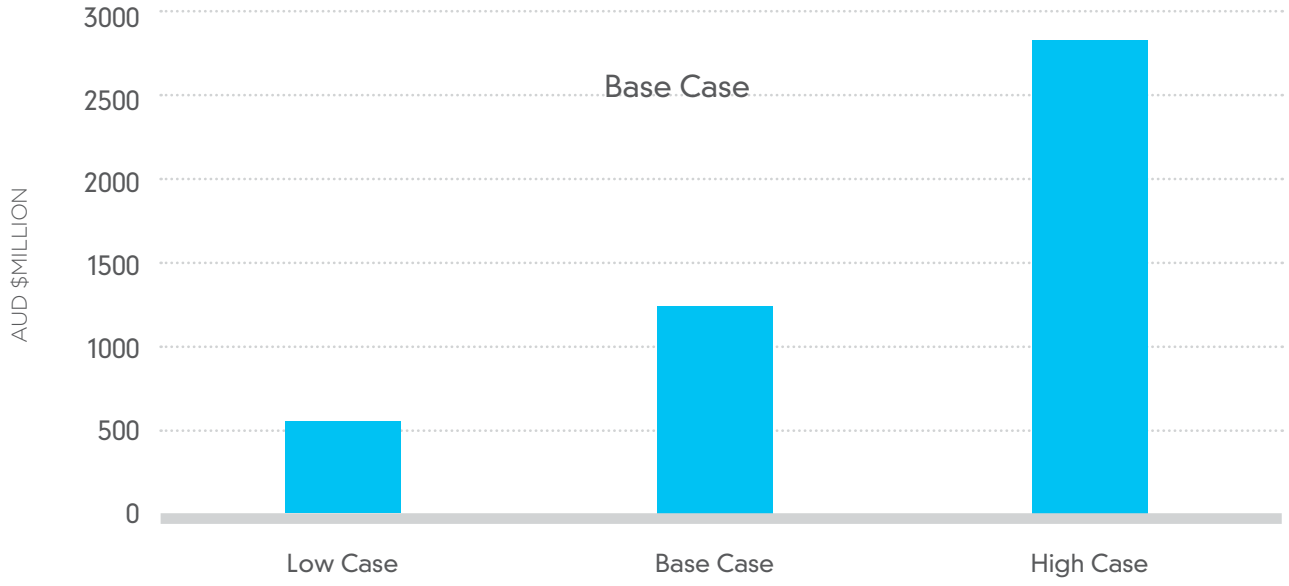
It is, of course, quite possible that some realised years would look more like one case or another, so that there may be a mixture of higher- and lower-revenue years. Because there is no growth in nameplate capacity over time, and inflationary effects (such as they are in the current very low-inflation environment) tend to wash through the revenue and the cost side, estimated multi-year revenue calculations involve simply multiplying the annual figures.

Over the 4-year "forward estimates" period of the federal budget the impact is expected to be A$5.077 billion under the base case, A$2.207 billion under the low case, and A$11.361 billion under the high case (Figure 3.3). Figures 3.4 and 3.5 highlight this, as well as the 10-year revenue impact for the three cases. Over the 10 year estimates, the base case would be expected to deliver A$12.693 billion, with the low case expected to raise A$$5.517 billion and the high case A$28.403 billion.

FIGURE 3.3
Projected four-year revenue under base, low, and high case scenarios.

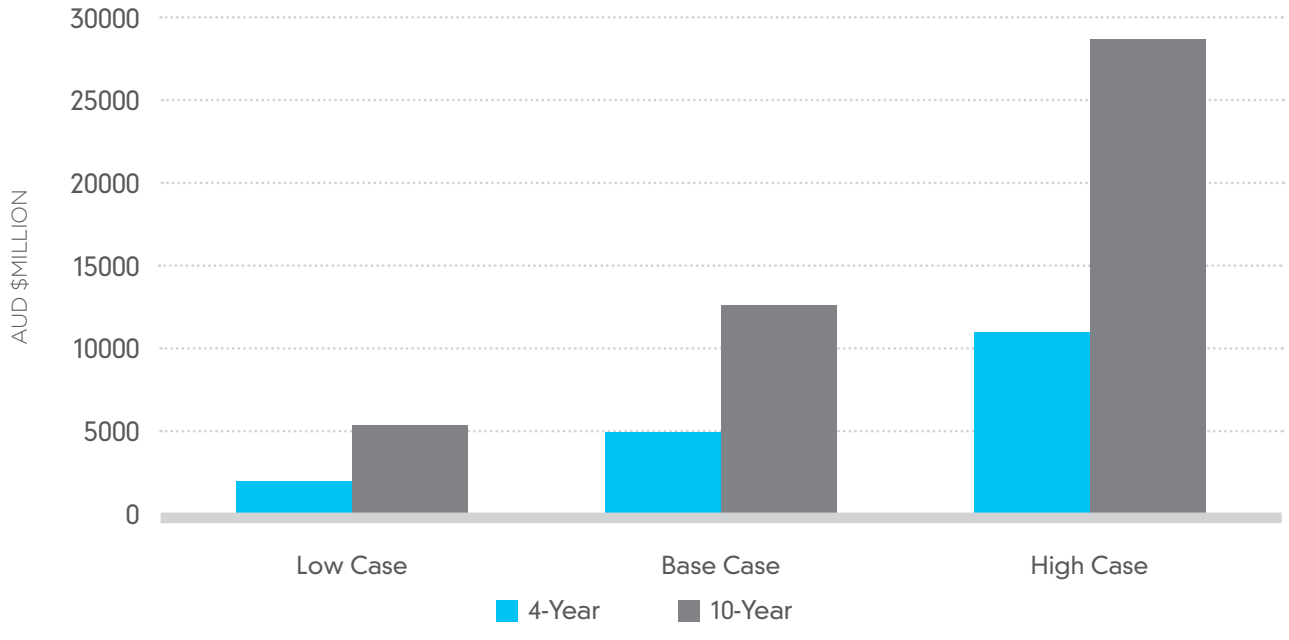
	Forecast 4-year revenue
Base Case:	A$5.077 billion
Low Case:	A$2.207 billion
High Case:	A$11.361 billion

FIGURE 3.4 Projected annual royalty revenue under low, base, and high case scenarios.



Source: : TO COME

FIGURE 3.5 4 and 10-year revenue projections under low, base and high case scenarios.



Source: : TO COME

Evidence suggests the PRRT will not raise any revenue from offshore plants

It is, of course, somewhat unclear what the potential lost PRRT revenues will be as a consequence of introducing a royalty-based regime – either through abolishing it, or keeping it with tax deductibility of royalties paid. There is, however, strong evidence to suggest that the PRRT will not raise any revenue from offshore LNG plants, certainly in the foreseeable future.

The PRRT model was based in large part on the approach used for North Sea Oil, which is an inapposite comparison. By contrast with North Sea and other oil-field "super profits" taxes, offshore LNG plants have a lower annual rate of return but a longer lifespan. The large upfront capital expenditures and provisions for "uplifts" mean that no PRRT is likely to be paid for 15-20 years, if at all.

In addition to this, because of the vertically-integrated nature of the value chain, there is significant scope for the use of transfer pricing arrangements to circumvent a PRRT regime. Taken as a whole, these factors suggest that no revenue would be lost through the extension of a royalty-based regime as applies to the North West Shelf and onshore projects. Several market participants suggested in private conversations that the offshore LNG owners do not expect to pay any PRRT – and no longer even factor in such calculation to their financial analysis. The conclusions from these conversations are also corroborated by industry modelling regarding future revenues likely to be generated from the PRRT. The Australian Petroleum Production & Exploration Association (APPEA) affixed modelling from Wood Mackenzie, a consulting firm often contracted by oil and gas industry entities to its submission to the PRRT review in February, 2017. Its modelling of the Gorgon project, in Commonwealth waters off Western Australia, suggests that the project would not generate any PRRT revenue until oil prices reach $80 per barrel. Some estimates predict that this price will not be reached until 2030. This means that it is unlikely, according to Wood MacKenzie modelling, that the Gorgon project would ever deliver any PRRT revenue to the government.[59]

A royalty based regime is unlikely to deter investment

The findings outlined in this report demonstrate that the PRRT seems unlikely to collect much if any revenue, and that a royalty-based regime will collect a non-trivial amount of revenue, this would, all else equal, act to discourage investment. There are, however, five important points to note in that regard.

First, the investments considered in this report have already been made – they are "sunk" – and are not reversible. A move from PRRT to royalties cannot affect sunk investment behaviours.

Second, future investments in LNG plants – should they be deemed desirable under any resource taxation or royalty regime – are likely to be extremely large and lumpy. The standard argument that an increased tax leads to less investment assumes, essentially, infinite divisibility of investment projects. LNG plants are almost the polar-opposite case. A modest royalty would arguably have no impact on future investment behaviour because of this lumpiness/indivisibility.

Third, many firms use a "hurdle rate" of return to assess investment projects and make a binary decision to invest or not invest depending on whether the post-tax return is above the hurdle rate. Again, a modest royalty may push down the post-tax return but still leave that return above the hurdle rate, thus leading the firm to pursue the investment despite the royalty payments.

Fourth, firms factor in future expected tax regimes and political behaviour. In light of public debate on these matters, the presence of royalties for onshore LNG plants, and the existence of a tax regime, albeit an ineffectual one (the PRRT), it seems unlikely that firms would not have factored in a material possibility of a future royalty regime. Moreover, a number of affected firms are already liable for Commonwealth royalties as participants in the North West Shelf project.

And finally, the potential negative effects of market views about "sovereign risk" need to be taken into account. A shift away from the resource tax or royalty regime in place at the time of initial investment may be interpreted as retrospective policy making. Likewise, at the approvals stage,

investors in resource projects estimate the expected revenues to host governments.[60] Both governments and firms accept a degree of risk when they commit to the development of resource projects.

It is worth noting that Australia enjoys an excellent position in this regard, particularly in comparison to many other resource-rich countries. Australia's royalty and resource tax regime would remain low by global standards. Data from IMF country reports and BP's statistical review of world energy shows that all other top LNG exporters – Qatar, Malaysia, Nigeria and Indonesia – secure more than double the share of government revenues as a percentage of oil and gas production, compared with Australia. For example, Malaysia received US $20.2 billion in oil and gas revenues in 2014, nearly three times as much as the PRRT and corporate tax revenues from all Australian oil and gas combined, even though Malaysian production levels were less than 30 per cent above those of Australia. The 10 per cent royalty is almost half the rate levied by the US Federal Government on offshore production, and sits towards the low end of the range that applies in Alberta of between 5 and 40 per cent.[61]

Royalties could contribute up to $28.4 billion over the 10 year forward estimates

Royalties would, of course, contribute to consolidated revenue. It is worth noting, however, that these revenues would stem from the use of an asset and it would be sensible to treat the proceeds of one capital item as contributing to other capital items. The Future Fund is a good example of where the sale of a public asset was earmarked to be used to fund public liabilities. The 4-year impact in the base case of just over $5 billion would be a significant, albeit not overwhelming, contribution to the Commonwealth budget.

CONCLUSION

> This report has outlined the need to apply a fair, consistent royalty based regime for Australia's non-renewable gas resources that are extracted from Commonwealth waters, and sold for profit.

The world is on the cusp of a new gas boom. International demand is soaring and is only expected to grow in the coming years. And natural gas is playing a central role in a global transition away from more heavily polluting energy sources such as oil and coal. Considering the growth of Australian gas exports, it is essential that the Commonwealth Government have in place a system that adequately remunerates the Australian public for these valuable Australian resources that will only ever be extracted once.

The Petroleum Resources Rent Tax, the only resource taxation regime that governs new extraction of gas from Commonwealth waters is simply not delivering a fair level of remuneration to the Australian public. This report has identified that PRRT receipts are forecast to decline dramatically at the same time as international demand for gas rises and profits are expected to grow. Compared to other countries rich in natural gas, Australia has so far been incapable of generating an adequate return to the public for the extraction of these national resources.

By extending the Commonwealth's royalty-based regime to cover all offshore LNG projects, Australia can fairly capitalise on the growing demand for gas, and ensure the potential benefits of this gas boom for the Australian public are realised.

It is essential to remember that the resources in Commonwealth waters are the property of all Australians, not the companies that extract these resources and sell them for profit. At a state level, this is widely understood, with royalties paid on the extraction of state owned resources. Currently, this does not apply evenly to resources within Commonwealth waters. This discrepancy is unnecessary, and costs the Australian public significantly.

The implementation of a consistent Commonwealth royalty regime is the most effective and fair way of compensating Australians for the extraction of Australian-owned natural resources. In the base case scenario outlined in this report, government revenue would be expected to reach $1.269 billion annually. This report has also identified that, under ideal circumstances over four-year forward estimates, a royalty based regime could raise as much as $11.361 billion, or $28.4 billion over the decade. These figures contrast with the decline in PRRT revenue, which is expected to fall to $0.81 billion annually by 2019-2020, with not a cent in PRRT delivered from new offshore LNG projects at current prices.

Australia's natural resources are non-renewable. Australians deserve to be fairly compensated for the extraction, and for-profit-sale, of these vital national commodities. Now is the time to move away from relying solely on the unreliable PRRT, towards a more equitable and reliable Commonwealth royalty based regime that will deliver better economic outcomes for all Australians.

REFERENCES

1. Alberta Energy, *What is natural gas?*, 2017. Viewed 27 January 2017: http://www.energy.alberta.ca/naturalgas/723.asp
2. Conserve Energy Future, *Advantages and disadvantages or natural gas*, 2017. Viewed 19 January 2017: http://www.conserve-energy-future.com/advantages-and-disadvantages-of-natural-gas.php
3. Ibid
4. Australia Pacific LNG, *Liquefied natural gas*. Viewed 19 January 2017: https://www.aplng.com.au/topics/liquefied-natural-gas.html
5. Natasha Cassidy and Mitch Kosev, 'Australia and the Global LNG Market,' *Bulletin*, The Reserve Bank of Australia, March Quarter 2015. Viewed 24 January 2017: https://www.rba.gov.au/publications/bulletin/2015/mar/pdf/bu-0315-4.pdf
6. Australia Pacific LNG, *Liquefied natural gas*. Viewed 19 January 2017: https://www.aplng.com.au/topics/liquefied-natural-gas.html
7. Essential Energy, *What is Natural Gas?* 2017. Viewed 19 January 2017: https://www.essentialenergy.com.au/content/education-natural-gas
8. Ibid
9. Australian Energy Market Commission, *Natural gas markets*, 2017. Viewed 19 January 2017: http://www.aemc.gov.au/Australias-Energy-Market/Markets-Overview/National-gas-market
10. Natasha Cassidy and Mitch Kosev, 'Australia and the Global LNG Market,' *Bulletin*, The Reserve Bank of Australia, March Quarter 2015. Viewed 24 January 2017: https://www.rba.gov.au/publications/bulletin/2015/mar/pdf/bu-0315-4.pdf
11. Ibid
12. Ibidf
13. Ibid
14. Ibid
15. APPEA, *Australian LNG projects*, 2016. Viewed 27 January 2017: http://www.appea.com.au/oil-gas-explained/operation/australian-lng-projects/
16. Phin Ziebell, Riki Polygenis and Alan Oster, *Gas and LNG market outlook: January 2017*, National Australia Bank. Viewed 30 January 2017: http://business.nab.com.au/wp-content/uploads/2017/01/gas-and-lng-market-outlook-Jan17.pdf
17. http://www.ga.gov.au/scientific-topics/energy/resources/petroleum-resources/gas
18. Tim Treadgold, 'The golden age,' *BRW*, 30 March 2006; and Damian Frith, 'LNG investment gets boost,' *The Australian*, 4 November 2006.
19. James Chessell, 'Doubts rise about Australia's next LNG boom,' *Australian Financial Review*, 5 June 2015. Viewed 30 January 2017: http://www.afr.com/business/energy/gas/doubts-rise-about-australias-next-lng-boom-20150604-ghh8at
20. James Chessell, 'Doubts rise about Australia's next LNG boom,' *Australian Financial Review*, 5 June 2015. Viewed 30 January 2017: http://www.afr.com/business/energy/gas/doubts-rise-about-australias-next-lng-boom-20150604-ghh8at; and Australian Government, *The Snowy Mountains Scheme*, Australia.gov.au. Viewed 30 January 2017: http://www.australia.gov.au/about-australia/australian-story/snowy-mountains-scheme
21. James Chessell, 'Doubts rise about Australia's next LNG boom,' *Australian Financial Review*, 5 June 2015. Viewed 30 January 2017: http://www.afr.com/business/energy/gas/doubts-rise-about-australias-next-lng-boom-20150604-ghh8at
22. Mark Adeosun, 'Global LNG Market Outlook,' *Oil and Gas Financial Journal*, 14 November 2016.
23. Phin Ziebell, Riki Polygenis and Alan Oster, *Gas and LNG market outlook*: January 2017, National Australia Bank. Viewed 30 January 2017: http://business.nab.com.au/wp-content/uploads/2017/01/gas-and-lng-market-outlook-Jan17.pdf
24. International Gas Union, 2016 *World LNG Report: LNG 18 Conference & Exhibition Edition*, 2016, p9. Viewed 23 January 2017: www.igu.org/download/file/fid/2123
25. Australian Petroleum Production & Exploration Association, *Export revenue*. Viewed 23 January 2017: http://www.appea.com.au/oil-gas-explained/benefits/benefits-of-lng/export-revenue/
26. International Gas Union, 2016 *World LNG Report: LNG 18 Conference & Exhibition Edition*, 2016, p10. Viewed 23 January 2017: www.igu.org/download/file/fid/2123
27. BIS Shrapnel, 2014. *The Economic Impact of LNG Exports on Manufacturing and the Economy.* https://d3n8a8pro7vhmx.cloudfront.net/nationalawu/pages/135/attachments/original/1411953009/The_Economic_Impact_of_LNG_Exports_on_Manufacturing_and_the_Economy_Final_260914.pdf?1411953009
28. John M. Hartwick, 'Intergenerational equity and the investing of rents from exhaustible resources,' *The American Economic Review*, Vol. 67, No. 5, Dec 1977, pp. 972-974.
29. Pietro Guj, *Mineral royalties and other mining-specific taxes*, International Mining for Development Centre, Mining for Development: Guide to Australian Practice, 2012. Viewed 25 January 2017: http://im4dc.org/wp-content/uploads/2012/01/UWA_1698_Paper-01_-Mineral-royalties-other-mining-specific-taxes1.pdf
30. Queensland Government, 'Calculating petroleum royalty,' *Business and industry portal*, 2016. Viewed 25 January 2017: https://www.business.qld.gov.au/industry/mining/applications-compliance/rents-royalties/royalties/calculating-petroleum
31. Craig Bowie, *Review of mining royalties in Australia*, Minter Ellison, August 2016. Viewed 25 January 2017: http://www.minterellison.com/files/Uploads/Documents/Publications/Articles/Mining%20Royalties%202016.pdf; State Government of Victoria, 'Petroleum – Landowner questions answered', June 2016. Viewed 3 March 2017: http://earthresources.vic.gov.au/earth-resources-regulation/information-for-community-and-landholders/petroleum

32. Ken Henry et al, *Australian Government, Australia's Future Tax System: Report to the Treasurer*, December 2009. Viewed 25 January 2017: http://www.taxreview.treasury.gov.au/content/downloads/final_report_part_1/00_AFTS_final_report_consolidated.pdf
33. Ibid
34. Phin Ziebell, Riki Polygenis and Alan Oster, *Gas and LNG market outlook*: January 2017, National Australia Bank. Viewed 30 January 2017: http://business.nab.com.au/wp-content/uploads/2017/01/gas-and-lng-market-outlook-Jan17.pdf
35. Tegan Annett, 'Gas supply fears for Curtis Island LNG plants, new report finds,' *The Gladstone Observer*, 23 January 2017. Viewed 30 January 2017: http://www.gladstoneobserver.com.au/news/gas-supply-fears-for-curtis-island-lng-plants-new-/3134495/
36. Australian Government, *Review of the Petroleum Resource Rent Tax: Issues* Note, 20 December 2016
37. Ibid
38. Australian Government, Department of Industry, Innovation and Science, 'Petroleum Resource Rent Tax, *Resources*, 2016. Viewed 25 January 2017: https://www.industry.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/default.aspx
39. Ibid
40. Ibid
41. Ibid
42. Australian Government, *PRRT augmentation and gross domestic product factor rates*, 11 January 2017. Viewed 23 January 2017: https://www.ato.gov.au/Rates/PRRT-augmentation-and-GDP-factor-rates/
43. Australian Government, Department of Industry, Innovation and Science, 'Petroleum Resource Rent Tax, *Resources*, 2016. Viewed 25 January 2017: https://www.industry.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/default.aspx
44. https://www.industry.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/default.aspx
45. Ken Henry et al, Australian Government, *Australia's Future Tax System: Report to the Treasurer*, December 2009. Viewed 25 January 2017: http://www.taxreview.treasury.gov.au/content/downloads/final_report_part_1/00_AFTS_final_report_consolidated.pdf
46. Heath Aston, 'The gas boom is on but the riches for Australia are far from assured,' *The Sydney Morning Herald*, 15 October 2016. Viewed 25 January 2017: http://www.smh.com.au/federal-politics/political-news/the-gas-boom-is-on-but-the-riches-for-australia-are-far-from-assured-20161013-gs1u8p.html
47. Ibid
48. Ibid
49. Ibid
50. Ibid
51. Peter Milne, 'LNG tax changes in the wind', *The West Australian*, February 27, 2017. Viewed February 28 2017: https://thewest.com.au/business/lng-tax-changes-in-the-wind-ng-b88396644z
52. Natasha Cassidy and Mitch Kosev, 'Australia and the Global LNG Market,' Bulletin, The Reserve Bank of Australia, March Quarter 2015. Viewed 24 January 2017: https://www.rba.gov.au/publications/bulletin/2015/mar/pdf/bu-0315-4.pdf
53. Natasha Cassidy and Mitch Kosev, 'Australia and the Global LNG Market,' *Bulletin*, The Reserve Bank of Australia, March Quarter 2015. Viewed 24 January 2017: https://www.rba.gov.au/publications/bulletin/2015/mar/pdf/bu-0315-4.pdf
54. International Transport Workers' Federation, *An international comparison of Australian Government revenues from oil and gas production*, ITF Briefing Paper, November 2016.
55. Ibid
56. International Transport Workers' Federation, *An international comparison of Australian Government revenues from oil and gas production*, ITF Briefing Paper, November 2016. Peter Milne, 'LNG tax changes in the wind', The West Australian, February 27, 2017. Viewed February 28 2017: https://thewest.com.au/business/lng-tax-changes-in-the-wind-ng-b88396644z
57. Heath Aston, 'Nigerian government takes more in oil and gas revenue than Australia, analysis shows,' *The Sydney Morning Herald*, 22 November 2016. Viewed 17 January 2017: http://www.smh.com.au/federal-politics/political-news/nigerian-government-takes-more-in-oil-and-gas-revenue-than-australia-analysis-shows-20161121-gsu81p.html
58. This is somewhat analogous to the so-called "multiple causation" problem in tort law. See, for instance, Glen O. Robinson. 1982. "Multiple Causation in Tort Law: Reflections on the Des Cases" 68(4) *Virginia Law Review* 713-769
59. Wood Mackenzie, 2017. 'Independent Report on the PRRT Review in Australia', page 14. Viewed February 28 2017: http://www.treasury.gov.au/~/media/Treasury/Consultations%20and%20Reviews/Reviews%20and%20Inquiries/2016/Review%20of%20Petroleum%20Resource%20Rent%20Tax/Submissions/PDF/Australian%20Petroleum%20Production%20and%20Exploration%20Association%20APPEA.ashx
60. For example, see Gorgon Project, *Draft Environmental Impact Statement*, Chapter 15: Economic Environment Effects and Benefits, pp. 731-732. https://www.chevronaustralia.com/docs/default-source/default-document- library/chapter_15_economic_environment_effects_and_benefits.pdf?sfvrsn=0
61. Thuy Ong, 'LNG boom: Australian Government 'far behind' in capturing benefits, paper finds', *ABC News*, 22 November 2016. Viewed March 3, 2017: http://www.abc.net.au/news/2016-11-22/australia-government-revenue-oil-and-gas-production/8043326

CONTACT THE MCKELL INSTITUTE

T. (02) 9113 0944 **F.** (02) 9113 0949 **E.** mckell@mckellinstitute.org.au
PO Box 21552, World Square NSW 2002
@McKellInstitute www.facebook.com/mckellinstitute
www.mckellinstitute.org.au