

# Australia's oil and gas industry: kickstarting recovery from COVID-19

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## Abbreviations

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
APPEA	Australian Petroleum Production & Exploration Association
Capex	Capital expenditure
CSG	Coal seam gas
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FIFO	Fly-in fly-out
GDP	Gross domestic product
GNI	Gross national income
JV	Joint ventures
LNG	Liquefied natural gas
MMBOE	Million barrels of oil equivalent
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NWS	North West Shelf
Opex	Operating expenditure

## Here's what you need to know

- ▶ Australia's oil and gas industry has helped weather the country from more damaging economic fallout from COVID-19 by supporting jobs, preserving energy security and delivering steady export income.
- ▶ Our ability to secure the next wave of investment in oil and gas exploration and production has strong foundations but faces intense challenges. The investment landscape is riskier, with higher hurdle rates, and global competition for mobile capital is fierce. Many producers are now focusing on smaller, incremental projects (often in mature basins) rather than developing mega projects.
- ▶ In the current environment, there is an urgency to address Australia's competitive position through effective and nationally cohesive policy settings. Undue regulatory and tax imposts have heightened risk of deterring long term investment.
  - Strong opportunities exist to improve regulatory regimes by adopting clear risk-based frameworks and speeding up the time for project approvals.
  - Some key priorities for the tax system include maintaining stability in Australia's resource rent tax and royalty regime, optimising capital depreciation arrangements and supporting efficient restructuring of joint ventures.
- ▶ The economic dividends from unleashing a new wave of oil and gas developments are large. If we unleash the key projects which are currently in the industry pipeline, under a high growth trajectory, national economic output is estimated to increase by over **\$350 billion** with over **220,000 jobs** created over the next two decades.
  - Conversely, regulations which suppress the industry's potential to develop Australia's resources impose heavy economic costs. The economic efficiency losses of regulations which prevent the industry's investment pipeline from being realised could far exceed those from Australia's worst performing taxes. In fact, for **every billion dollars** of industry activity lost through regulation there could have an overall efficiency loss of up to **\$1.79 billion** to the economy. Such costs should be recognised alongside the potential social and environmental risks of projects which many regulations are seeking to manage or avoid.
- ▶ The gains from reinvigorated activity in the oil and gas industry have the potential to spread throughout the economy, providing a kickstart for Australia's industrial base by lowering energy prices, boosting demand for services, and generating wealth for all Australians.

## Executive summary

Australia is a globally preeminent exporter of energy with a longstanding track record as a stable and low-risk destination for major investment which capitalises on our world-class resource endowments. Over the last decade there has been a massive expansion in Australia's gas production capacity with more than \$350 billion invested in new gas fields and LNG facilities. Alongside Qatar, Australia has now risen to be a significant world exporter of LNG.

But the world has changed abruptly since the beginning of 2020. Australia's oil and gas industry is currently going through considerable disruption. Like almost every industry it is grappling with the immediate impacts of COVID-19 which, among a myriad of challenges, has intensified a protracted period of low global energy prices. Yet in the face of these pressures, the industry has a major role to play in continuing to support Australia's economic recovery from COVID-19, securing a new phase of investment and growth, creating jobs, and helping the long process of repairing public finances.

Indeed, unlocking new energy resources at scale builds wealth and economic resilience for the entire country.

### **Managing the complex economic challenges of COVID-19**

As a result of the COVID-19 pandemic, Australia is in a deep recession, the first in 30 years. With vast swathes of the economy having been shut down, coupled with domestic and international border controls, economic activity and confidence has deteriorated sharply. This is a historically unique crisis.

A key message from other crises is that recovery where there has been a sharp contraction in the economy and high unemployment is rarely, if ever, fast. Certainly, the longer the pandemic endures, the more difficult the process of reigniting economic activity will be. What will be crucial is the ability of the private sector to rebound and begin investing and hiring once restrictions are lifted and government support measures wind up.

Within the midst of the crisis, Australia's oil and gas industry has been a shining light, helping weather the country from more damaging economic fallout. The industry implemented a raft of measures during the first wave of the pandemic including relocating critical personnel and equipment, and new shift and fly-in fly-out arrangements. These responses enabled oil and gas businesses to maintain production and underpin Australia's trade performance while large parts of the economy were frozen. In fact, managing through the COVID-19 pandemic, value added generated by the oil and gas industry, which measures the industry's contribution to GDP, was up 24% on the previous year.

This contribution over the last six months highlights the role which Australia's industrial base, including oil and gas, mining and other capital-intensive enterprises play in generating lucrative export streams and diversifying the economy. In contrast, the most devastated areas of the economy from COVID-19 have been those which are heavily dependent on services. This is a pattern which has played out across advanced economies.

### **There are some major pressures on investment**

Looking forward, investment by the oil and gas industry is facing some major headwinds. The slump in oil and LNG prices, which has been exacerbated by the COVID-19 pandemic, has caused producers worldwide to cut expectations for revenues and global gas consumption over the next several years.

An immediate impact of the deteriorating business environment has been some significant write-downs on gas assets, especially LNG facilities, and downgrading of producers' capital spending

programs. Several targeted Final Investment Decisions have been delayed, including Scarborough, Pluto Train 2 and Browse and other backfill projects.

The nature of the investment pipeline is also changing. Many producers are focusing strongly on smaller, incremental investments (often in mature basins) rather than developing the mega projects which have dominated the landscape over the past decade. This accretive approach helps lower risks while prices have declined, as well as optimising existing resources and delivering capital efficiencies.

Australia's competitive position as a gas producer is also being challenged. Development costs for Australian oil and gas projects are high compared to new developments in the United States, Middle East and Africa. With strong competition within company capital allocations to secure funding and meet higher internal rate of return thresholds, the economics of many Australian gas projects have become more marginal. In effect, local projects now need to demonstrate their viability at the bottom of the price cycle as companies look to rebalance their investment portfolios in the current market.

The prospects for gas demand and prices to rebound quickly and underpin future growth in production capacity also has some major structural determinants. A key influence will be the long-term role of gas as an energy source, especially in terms of how it consolidates as a global alternative to coal fired power and its ability to complement higher penetration of variable renewable power generation within electricity systems. The capacity, in some circumstances, to integrate carbon capture and storage will also influence the use of gas as a fuel to lower-emissions electricity generation. Carbon capture and storage was recently identified as a priority technology with the potential for transformational economic and emissions outcomes, as part of the Australian Government's Low Emissions Technology Statement.

Based on existing fleets of power plants (where natural gas forms around 23% of global electricity generation) and other capital stock, there is likely to be significant demand for oil and gas for the next few decades. The International Energy Agency's 2020 World Energy Outlook underscores this potential, projecting consistent growth in the global demand for gas to 2040, particularly in Australia's trading markets in Asia, under each of its scenarios.

## **A supportive policy environment is needed to kickstart investment**

Australia's ability to secure the next wave of investment in oil and gas exploration and production has strong foundations – we are a proven, dependable and low risk exporter of energy and minerals, with proximity to industrial economies in Asia. But competition with other lower-cost and stable jurisdictions is fierce, and global capital can often achieve better returns in other producing countries.

This places increased importance on establishing policy settings which can attract investment in the oil and gas industry over the long term. With the next generation of Australian gas projects needing to meet higher hurdle rates, the potential for undue tax and regulatory imposts – separately and in conjunction – to stifle investment going forward is significant. Indeed, key facets of Australia's policy and regulatory framework were put in place when gas projects were much larger and underpinned by buoyant prices. This environment has changed.

There are some key areas where policy attention to support investment and address Australia's competitive position is urgent.

### *Regulatory approvals*

Australia's oil and gas businesses operate in a complex regulatory landscape. All levels of government have a role in creating and administering frameworks governing the approval of project investments and licenses to operate.

A key regulatory challenge involves improving the time required to obtain environmental approvals, with problems in how state and federal regimes interact. The duplication and overlap of federal and state responsibilities within the Environmental Protection and Biodiversity (EPBC) Act, Australia's major plank of environmental regulation, has been identified as a significant (and worsening) cost and time impediment for gas projects. Problems with how the EPBC Act is designed and administered have been highlighted by the Productivity Commission in its current review of resource regulation, as well as the current independent review of the EPBC Act.

Initiatives to reduce red and green tape, while appropriately managing project development risks, are to be welcomed. In this regard, there are strong opportunities to improve regulatory regimes by adopting clear risk-based frameworks. This would identify and assess the risk associated with gas projects and adjust regulatory requirements accordingly. Where gas projects and their underpinning production techniques have established proof of concept and a strong environmental safety record, regulatory compliance would be lighter, and approval timeframes accelerated.

Australia's achievements in commercialising gas production over decades should, in principle, be reflected in how all levels of government manage assessment and approval processes. Recent successes in adjusting regulatory requirements and fast-tracking project approvals as part of COVID-19 emergency responses showcase how regulatory regimes might function under more normalised conditions. Low cost and speedy project approvals, without compromising standards, will be fundamental to shoring up Australia's competitive position.

### *Managing community engagement to unlock new oil gas provinces*

The commercialisation of highly prospective new oil and gas provinces such as the Sydney Basin and the Great Australian Bight has shown to be extremely challenging. Alongside the technical and commercial challenges of frontier exploration and development there is increased concern regarding focus by investors on the role of the industry in a carbon constrained world.

Proponents have also been confronted with highly coordinated groups opposing the developments, typically on environmental grounds. While approval requirements need to consider the views of the community and risks inherent to projects, they are not well suited to managing the sheer influx of activist opposition which can be marshalled using social media.

Both government and industry can play a pivotal role in helping manage community sentiment, especially to facilitate frontier basin opportunities. These could involve measures to highlight the industry's outstanding record of safety and environmental stewardship, the economic benefits that resource development provides to the country (which is discussed below), and the strategic gains from improving Australia's fuel security.

### *Tax settings*

Australia's fiscal regime has generally well-supported the development of the nation's oil and gas resources. Our record as a world leading resource exporter is testament to Australia's stable and transparent tax system. However, our ability to encourage mobile capital into Australia to build the resource base will depend on the competitiveness Australia's tax regime. Simply, foreign investors face many choices on investment destinations and opportunities will not come to Australia if returns are pushed down by a relatively high tax burden.

To incentivise investment and business expansion, there are some key priorities for the tax system:

► Maintain stability in Australia's resource rent tax and royalty regimes

The Petroleum resource rent tax (PRRT), which covers offshore oil and gas production, has worked well over several decades. While there are some concerns regarding the adequacy of PRRT receipts, there are major risks that any increase in the regime, either through changing the rate in which profits are taxed or how exploration, development and operating costs are deducted, could undermine project commerciality and discourage future investment.

Tax is an important factor in the investment case for gas projects. Taxes limiting returns and are assessed in the evaluation of sovereign risk. Producers with legacy assets have concerns (managed well so far) about their exposure to policies which lower the returns they receive. Further, Australia's field mix is also changing, with the cheap easy-to-recover gas mostly gone. A number of future Australian projects are located in deeper water and further offshore than earlier developments. An increase in the tax burden could result in these discoveries being abandoned.

► Optimise capital depreciation arrangements

Oil and gas projects are characterised by long lead and construction timeframes, substantial upfront costs and long payback periods. The economics of these projects tends to be finely balanced. Arrangements to depreciate installed capital can thus impact project viability, especially in an environment in which competition for global capital is aggressive.

It is crucial that capital depreciation arrangements are strongly aligned with the economics of gas projects, especially as economic pressures change. Statutory capital write-off caps of 15-20 years are typically well within the effective life of these projects, which can often exceed 45 years. However, depreciation allowances only come into effect when a project is fully commissioned and starts producing. For projects with long construction periods (large LNG projects can take over six years to build), this has major timing implications for tax credits.

Importantly, some key competitor countries have shorter depreciation timeframes and enable installed capital to be depreciated after two years (e.g. Canada), rather than when a project is fully completed.

► Support efficient restructuring of joint ventures

New oil and gas projects in Australia have traditionally been developed using joint ventures. The large LNG projects are owned and operated using these vehicles. JV structures provide a range of cost and risk advantages, enabling exploration and development costs to be spread, aggregation of adjacent projects and common-use infrastructure, access to technical expertise and capital pooling. They often involve asset swaps to give participants a proportionate share of each project's assets, and thus align commercial interests.

Given the long economic life of gas projects, JVs often need to be realigned to reflect participants' changing commercial priorities, as is currently occurring in the North West Shelf JV. These transactions, like the projects themselves, are complex and have major infrastructure valuation, revenue, capital raising and tax consequences. It is imperative that the tax treatment of JV realignments does not impede establishing capital efficient project structures which can maximise resource development opportunities.

To this end, there are concerns that the tax treatment of capital gains can potentially discourage (or slow down) beneficial JV transactions and impose a barrier on entry and exit. Particular issues relate to how project costs can be deducted and whether the shifting of interests is considered a realignment or divestment. As a principle, the tax system should enable JVs to be restructured in a clear, cost-effective and straightforward manner.

## Unleashing the industry's potential

In the face of mounting global competition for oil and gas developments, and to support recovery from COVID-19, there is an urgency to address Australia's competitive position with effective regulatory and tax settings. Without concerted action to back business in, the ability to harness the next wave of investment will diminish.

The potential whole-of-economy gains from firming and building the industry's productive foundations over the next two decades are examined under two alternative growth scenarios:

- ▶ **Low growth scenario** – This scenario encompasses investment and production for oil and gas projects that are currently under development or have a high level of investor commitment. The scenario, which also includes capex to sustain existing facilities and fields, represents aggregate industry activity if oil and gas businesses maintain existing portfolios and deliver already locked-in production expansion plans, but do not move beyond a near term growth trajectory. Under the low growth scenario, projected production is, on average, 5.8% higher than the 20-year historical average.
- ▶ **High growth scenario** – This scenario builds on the low growth scenario and includes oil and gas investments and associated production yields for projects that are considered prospective, but which have higher development uncertainty and have not yet secured firm commercial commitments. It highlights a visible frontier of resource development and industry expansion that could be realised under favourable policy and market conditions. Under this scenario, average production is significantly higher than the 20-year historical average – with a 64% increase.

The analysis highlights that the economic dividends from strengthened industry investment is significant and will help create jobs, generate growth across a broad range of sectors and underpin prosperity over the long term.

Industry expansion under the low growth scenario is estimated to raise national economic output by around **\$24.6 billion** and generate close to **11,000 jobs** over the next five years as Australia recovers from the COVID-19 recession (see Table 1). Tax receipts from expanded industry investment and growth could be higher by around **\$137 billion**. Over the period to 2040, when long run gains from new oil and gas investments can be realised, economic gains are estimated to be in the order of **\$176.4 billion** and generate **105,000 jobs**.

The potential impacts of a high growth scenario for the industry are considerably higher, reflecting the gains from investments which open-up and capitalise on new gas provinces. Under this 'step change' growth trajectory, national economic output is estimated to be over **\$350 billion** higher and boost employment by **220,000 jobs** over the next two decades. The industry's fiscal contribution is also elevated and is estimated to return over **\$286 billion** to government to 2040. This represents an increase in aggregate tax receipts of **208%** over the low growth scenario, highlighting the benefits that successful industries play in shoring up public finances and helping fund services for all Australians – when policy setting enable their potential to be unlocked.

In addition to raising national income and employment, a key aspect of the growth scenarios for the oil and gas industry is the extent to which they provide spill over benefits for other industries (see Figure 1). Both growth pathways have the potential to deliver broad ranging gains as oil and gas investment, export production and job creation increase opportunities for supplying businesses and boost aggregate demand across the economy. Significant benefits may also accrue for finance and professional services, trade and communications, emphasising the close economic linkages between strategic capital-intensive businesses in regional and remote areas of the country and city-based service providers.

There is also a major stimulus for Australia's manufacturing and construction businesses. Over the next 20 years, activity in these sectors is estimated to increase by close to **\$40 billion** under the high growth scenario. A key supply-side channel involves the role of expanded gas production –

especially when a major wave of investment can unlock major new gas resources – in driving down gas and electricity prices for energy intensive firms.

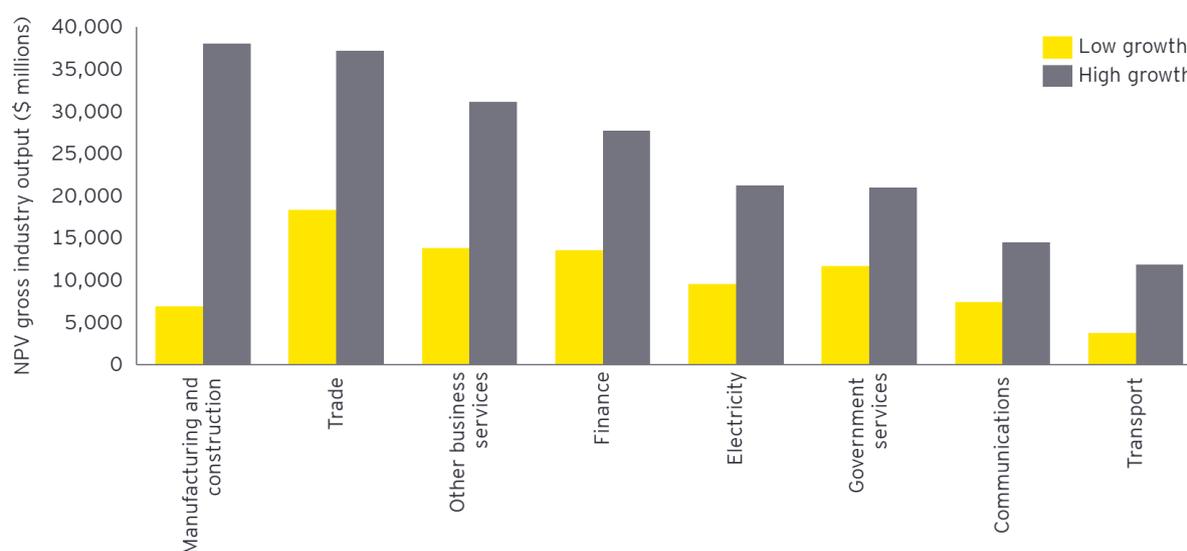
Table 1: Economic impacts of industry growth scenarios

Variable	2021-40	2025	2030	2040
<b>Low growth scenario</b>				
Gross Domestic Product (GDP), \$billion^	176.4	24.6	19.1	20.0
Gross National Income (GNI), \$billion^	136.5	26.7	11.7	12.2
Employment, FTE*	105,000	11,000	4,000	5,000
<b>High growth scenario</b>				
Gross Domestic Product (GDP), \$billion^	352.7	27.4	41.8	47.9
Gross National Income (GNI), \$billion^	241.9	30.1	27.6	28.1
Employment, FTE*	220,000	13,000	11,000	13,000

^ Estimates are reported as Net Present Value (NPV) and adopt a discount rate of 7%. \*Employment is reported as a cumulative total and is not discounted.

Source: EY analysis.

Figure 1: Gross industry output, NPV (2020-2040)



Source: EY analysis.

### Recognising the economic costs of regulation

Oil and gas developments are frequently subjected to a high level of public scrutiny, particularly around environmental and planning laws. Recent approval processes for the Narrabri gas project are a case in point. Planning and other approval gateways accentuate delays, increase risks, and add to the time needed for facilities to be built.

While regulations serve a vital role in improving social, environmental and economic standards, ongoing and continuous refinement to deliver better regulatory outcomes and manage costs for businesses is crucial. In a highly competitive global market for capital, as we currently observe, suboptimal regulatory costs have a higher potential to impede investment and act as a handbrake on economic growth. In this way, regulation has similar cost features as taxes, which generate (big or small) disincentives on labour supply, investment, savings and other economic decisions.

The tax 'equivalence' of regulation on the industry growth paths was assessed and compared with the efficiency of Australia's current tax mix. A proxy tax which would reduce the oil and gas industry from a high to low growth trajectory over the next 20 years would be highly inefficient, with a marginal excess burden (the economic efficiency losses from raising a tax) of 0.79, which far exceeds the costs imposed by existing taxes. The analysis shows that regulations which lower the industry from its current investment and production frontier are very costly in economic terms.

A key aspect of these economic costs is that because, unlike taxes, regulation does not generate revenue for the government, which funds programs and circulates throughout the economy. Rather, regulation typically has few multiplying impacts. In fact, every billion dollars of industry activity lost through regulation could generate an overall economic efficiency loss of up to \$1.79 billion. These costs should be recognised alongside the potential social and environmental risks of projects which many regulations seek to manage or avoid.

Policymakers would be rightly concerned about taxes which impose such heavy and narrow costs on an industry. Such scrutiny should also be applied in considering options to reduce the regulatory burdens on Australia's strategic resource and energy industries. Indeed, to the extent that excessive regulation imposes a lower growth path on the oil and gas industry, the economic costs would be extremely high. Accordingly, the dividends from better and less costly regulations for all Australians could be large.

## Going forward

The oil and gas industry will play a significant role in supporting recovery from the COVID-19 recession, as it has since the crisis emerged, and improving the country's long run growth prospects. A renewed phase of at scale industry investment is vital to fully realise the economic dividend from Australia's oil and gas resources.

But current market conditions facing the industry are challenging and investment uncertainty remains high. It is not possible to anticipate the extent and timing for global demand and prices to regain momentum. What is imperative is our ability to develop a competitive and agile business environment so we can fully capitalise on new project opportunities and meet growing competition from other gas producing countries.

# 1. Introduction

The COVID-19 pandemic might well be the most disruptive event of our lifetime. The combined health and economic shocks are reshaping almost all aspects of our business, political and social environment. The effects will likely be felt for decades.

Australia, like the rest of the world, faces enormous challenges managing the pandemic. Large parts of the economy have been locked down, coupled with domestic and international border controls, to impose social distancing. The longer the crisis endures the more difficult the process of reigniting economic activity. It is likely there will be a sustained period of economic weakness and mounting fiscal pressures on government.

Within the current crisis, Australia's oil and gas industry has been a standout performer, helping buttress Australia from more damaging economic fallout. Production volumes, export performance and energy security have been maintained. There is no more important time, when government is attempting to stimulate economic activity, to be able to rely on secure streams of 'hard currency' from overseas gas sales.

But this success, which has been built on decades of innovation, investment and international engagement, cannot be taken for granted. Indeed, the industry is confronting its own challenges – perhaps the most difficult business conditions it has faced in decades. Looking forward, there are strong headwinds including protracted low prices, significant asset write-downs, and a more modest investment pipeline which is focused on incremental projects.

There is strong cause for optimism – Australia is a world-class and low risk exporter of energy and minerals – but tax and policy settings which continue to promote long term investment and growth are needed.

In this context, EY has been engaged by APPEA to examine how the oil and gas industry can support Australia's economic recovery from the COVID-19 recession. The assessment highlights how Australia's oil and gas facilities provide critical economic diversification during the crisis, and how good tax and regulatory policies can maximise strong industry growth and investment, for the benefit of all Australians.

## Report structure

This report is structured in the following chapters.

**Chapter 2** provides an overview of Australia's oil and gas sector, including production, reserves, investment, exports and domestic consumption, as well as latest developments. The chapter highlights the substantial increase in LNG production over the last decade, which has now propelled Australia to one of the world's largest LNG exporters.

**Chapter 3** showcases the industry's recent success in managing the COVID-19 crisis. It discusses how oil and gas businesses maintained production, quickly adjusted to different operating requirements and underpinned Australia's trade performance while large parts of the economy were shut down. The industry's economic support during the height of the crisis, when the economy contracted sharply, is also shown.

Looking forward, Australia's oil and gas industry is now in an investment phase which is concentrated on smaller, incremental investments (often in mature basins) rather than the mega projects which have dominated the landscape over the last 10 years or so. **Chapter 4** examines the outlook on investment in the industry, focusing on how lower gas prices and competition for capital within firms are affecting the scale and scope of projects, and where bright spots are emerging.

**Chapter 5** discusses the key policy issues confronting the industry. It discusses the current tax and regulatory environment and how these are affecting industry investment, especially considering current risk drivers and next-generation project opportunities. Areas where reforms could be made to improve policy certainty, lower costs and enhance project commerciality are identified.

The ability to capitalise on Australia's world-class energy endowments, supported by growth-promoting policy regimes, is crucial to boosting national wealth and community living standards over the next decade and beyond. Building on the preceding chapter, **Chapter 6** highlights the potential for renewed industry investment to drive sustainable economic growth and employment, as Australia first manages the COVID-19 crisis and then commences the long path of economic recovery. Some alternative growth paths for the industry are also presented highlighting the national economic impacts if investment conditions are weakened. **Chapter 7** provides some concluding comments.

## 2. A snapshot of Australia's oil and gas industry

Australia is gifted with abundant natural resources which we have capitalised on to become a world leader in energy and mining. Leveraging these endowments, Australia's oil and gas industry has become a key economic pillar and globally significant energy producer. The industry plays a critical role in supporting Australians – not only in meeting our domestic energy needs but also generating long term export revenues. Importantly there are also significant reserves and basins yet to be developed which will help drive (under the right conditions) major economic opportunities going forward.

Over the years, the industry has undertaken a slow shift away from oil and towards gas development. This divergence has primarily occurred due to the discovery of new world-class gas resources and the absence of new oil discoveries in which to replace depleting assets.

This trend has accelerated over the past decade, with the oil and gas industry experiencing an LNG fuelled investment boom. Since the early 2010s, several industry-shaping greenfield LNG projects have been approved and production has rapidly expanded, particularly on the east coast. This has propelled Australia to become the world's second largest LNG exporter.

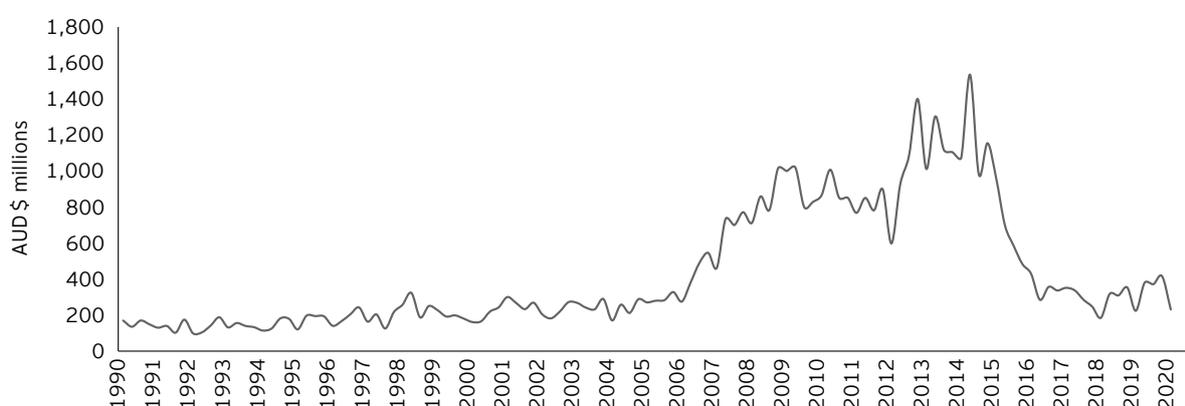
Looking forward, the industry is facing from a global decline in gas prices, as well as an increase in global competition to secure investment. Despite challenges, there is strong cause for optimism in looking at the future of the industry. There are many promising projects on the horizon and some projects undertaken in the recent resources boom have yet to fully realise their associated benefits.

### 2.1 Australia's LNG investment boom

Over the past decade, Australia's oil and gas industry has benefited from a surge in investment. Between 2010 and 2020, an estimated \$473 billion has been invested in the industry.<sup>1</sup> This has been driven by an increase in LNG capacity, with about \$305 billion invested in Australian LNG projects since 2010.

As shown in Figure 2, exploration expenditure surged in the early to mid-2010s, peaking in 2014. This showcases strong investment in large-scale LNG projects.

Figure 2: Total petroleum exploration expenditure (1990 - 2020)



Source: Australian Bureau of Statistics (March 2020), 8412.0 - Mineral and Petroleum Exploration, Australia.

This rise in LNG investment has highlighted a shift in the upstream petroleum industry away from oil and towards gas. There has been significant growth in the gas sector, including the construction

<sup>1</sup> Wood Mackenzie, 2020, *Australia Oil & Gas Industry Outlook Report*

of a new coal seam gas industry in Queensland. Over the last decade alone, gas production has increased by 140%.

As the industry transitions from an investment boom phase, it will begin to capitalise on the increase in LNG production associated with this investment. Many of the projects had high upfront development costs and lengthy payback periods, so the full benefits have not yet translated into direct government revenues. Underpinned by long-term contracts, these projects will provide strong export and revenue streams for several decades, and perhaps beyond.

## 2.2 Australia's mix of gas projects

Australia's petroleum industry has discovered, and developed resources dispersed across the country. The industry is diverse – with a unique mix of mature assets, such as the Cooper Basin, and emerging developments, like in Queensland where onshore gas is being unlocked. Throughout the country, there are both conventional natural gas assets (extracted from underground reservoirs) and unconventional gas resources (found as coal seam, shale and tight gas). As of 2019, Australian crude oil, natural gas and natural gas liquids production had exceeded 18 million barrels.<sup>2</sup>

Most of Australia's key LNG projects are in Western Australia and the Northern Territory. The two states are responsible for about 71% of Australia's LNG production capacity.<sup>3</sup> For more than 30 years, the offshore North West Shelf (NWS) project has provided Western Australia with a reliable supply of domestic gas, while facilitating the exports of LNG throughout the globe. There has also been an increase in LNG developments in Western Australia and the Northern Territory. An additional three LNG projects in Queensland represent 29% of production capacity. Appendix B provides an overview of Australia's 10 major LNG projects currently underway. Of these, seven are offshore projects and three are located onshore.

There has been rapid growth in Queensland's CSG industry, largely for LNG exports. Approximately 90% of gas reserves in eastern Australia are forms of unconventional gas. Improvements in extraction techniques, and \$70 billion worth of investment in CSG fields in Queensland (namely the Surat and Bowen Basins), has enabled the development of these reserves. In the last decade, about 7,000 gas production wells have been drilled in Queensland.

Most of Australia's crude oil and condensate comes from Western Australia, with the state providing about 70% of Australia's production. Key basins include Browse, Carnarvon and Perth. In the southern states, the Gippsland Basin is the main source of domestic gas.

The following basins have dominated Australian petroleum production (see Figure 3):

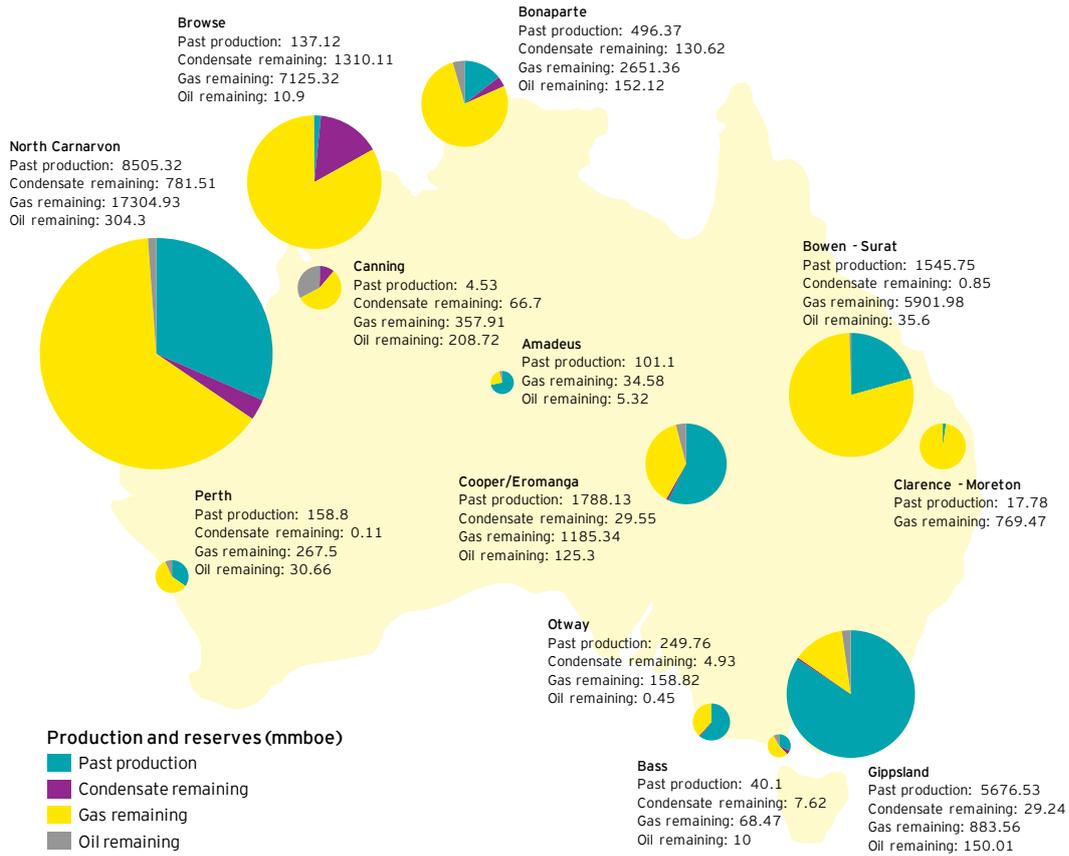
- ▶ Bonaparte, Carnarvon, Browse and Perth basins in Western Australia
- ▶ Gippsland, Otway and Bass basins off Victoria
- ▶ Cooper-Eromanga, Amadeus and Canning basins in central Australia
- ▶ Surat-Bowen basin in Queensland.

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<sup>2</sup> Wood Mackenzie, 2020, *Australia Oil & Gas Industry Outlook Report*

<sup>3</sup> Department of Industry, Innovation and Science, 2019, *Submission to the Senate Economics References Committee: Inquiry into Australia's oil and gas reserves*

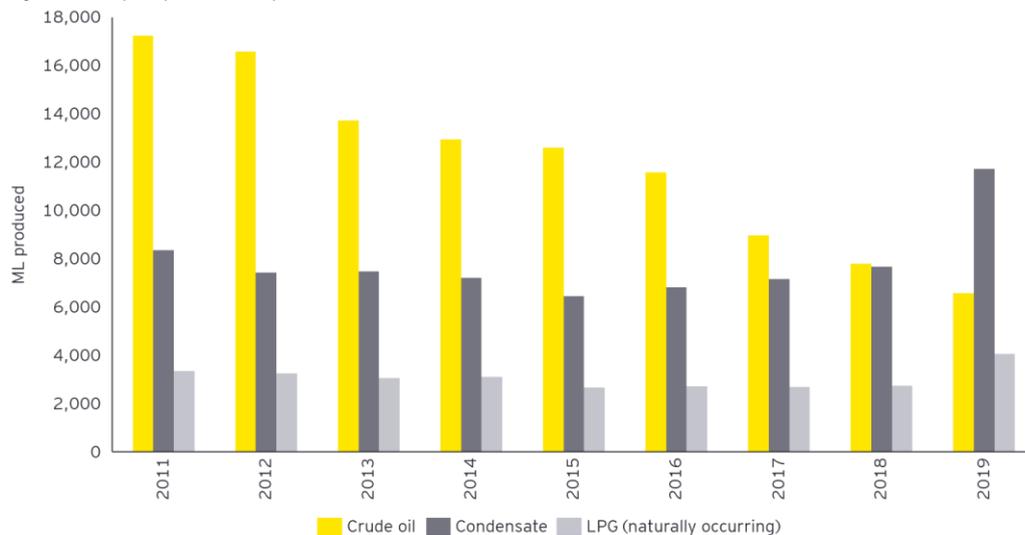
Figure 3: Oil and gas resource deposits in Australia



Source: Various.

Figure 4 and Figure 5 show Australia's liquid and gas petroleum production between 2010-11 and 2018-19. As shown below, crude oil and condensate comprise most of the production in Australia. However, crude oil production has been decreasing while natural gas has been rising since 2010-11. This highlights the shift away from oil and towards gas production. Going forward, this trend is likely to exacerbate.

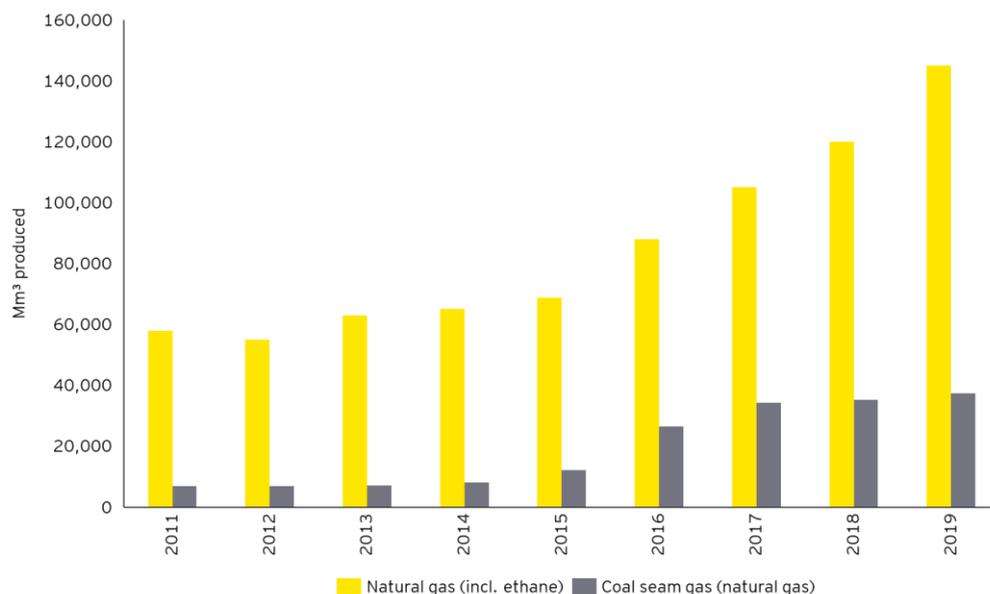
Figure 4: Liquid petroleum production in Australia (2010-11 - 2018-19)



\*Years refer to financial years i.e. 2011 refers to 2010-11

Source: Department of Industry, Science, Energy and Resources (2020), Australian Petroleum Statistics 2020.

Figure 5: Gas petroleum production in Australia (2010-11 - 2018-19)



\*Years refer to financial years i.e. 2011 refers to 2010-11

Source: Department of Industry, Science, Energy and Resources (2020), Australian Petroleum Statistics 2020.

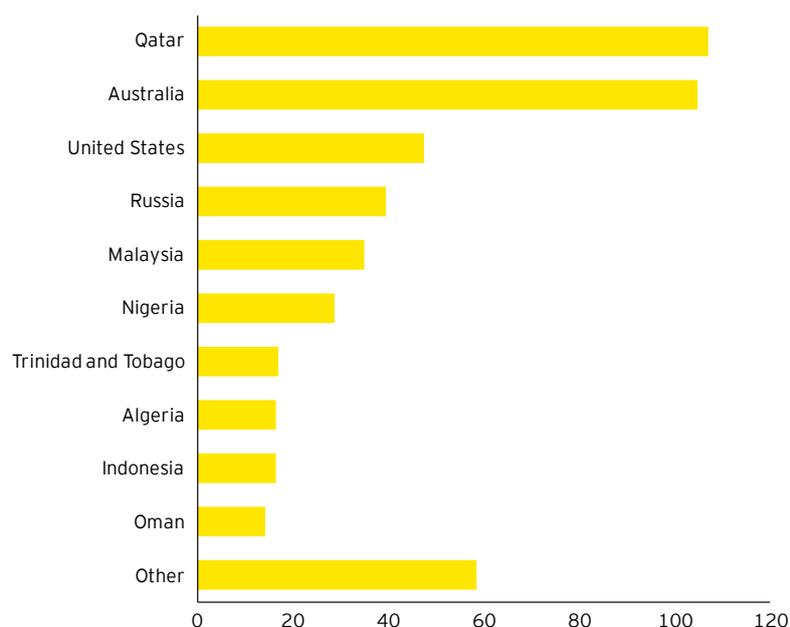
## 2.3 Supporting the Australian economy

The oil and gas industry plays an important role in supporting Australia's economy, providing a reliable source of energy for businesses and households and contributing about 2.5% of gross domestic product (GDP). APPEA analysis suggests the industry employs over 80,000 people, with a further 225,000 manufacturing jobs relying on natural gas. The industry also provides a major source of export revenues for the country and makes important contributions to Australia's tax base, particularly through state and federal resource tax arrangements.

Through trade with high demand growth markets in Asia, Australia has solidified its reputation as one of the world's leading sources of LNG. As highlighted in Figure 6, Australia is the second largest exporter of LNG, after Qatar. The Department of Industry, Innovation and Science estimated that Australia exported about 75 million tonnes, or \$50 billion of LNG in 2019. This makes LNG Australia's third largest export commodity after iron ore and coal.

In 2019, Australia earned \$17 billion in export earnings for LNG from China alone. Other significant export destinations included Japan, South Korea and Taiwan. While approximately 30% of gas produced in eastern Australia is consumed domestically, domestic gas users have recently proposed options to import LNG to increase supplies.

Figure 6: Top 10 LNG exporting countries 2019 (billion cubic metres)



Source: APPEA (2020), Key Statistics 2020.

The industry also makes an important fiscal contribution to the economy through higher tax receipts. Taxes paid by the industry (see Table 2) include the Petroleum Resource Rent Tax (PRRT), income tax, as well as royalties, excises and levies. It is important to note that many of the taxes are on profit (as opposed to revenue or production) which means that for large projects, there may be delays in tax payments.

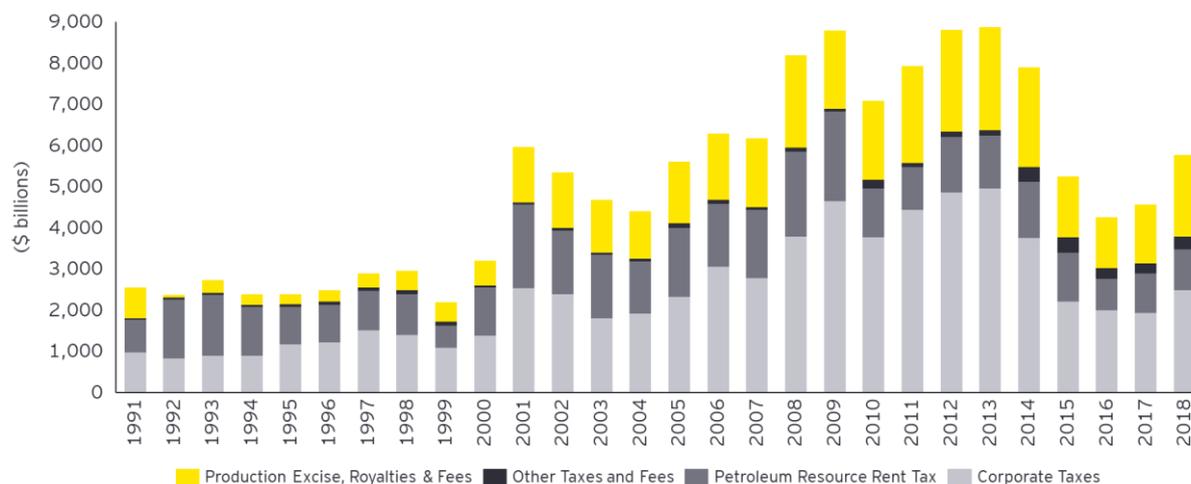
Table 2: Taxes paid by the oil and gas industry

Measure	Description	Application in Australia upstream fiscal regime
Royalties	<ul style="list-style-type: none"> <li>Levied on production / revenue</li> <li>Provides an up front and stable cashflow stream to government</li> </ul>	<ul style="list-style-type: none"> <li>Only applied to the North West Shelf project and fields under state jurisdiction</li> <li>Applied on market value of oil and gas at the wellhead</li> <li>Royalty rates vary by state and are typically between 10% and 12.5%</li> </ul>
Petroleum resource rent tax (PRRT)	<ul style="list-style-type: none"> <li>Levied on profit subsequent to the company having earned a hurdle rate of return</li> </ul>	<ul style="list-style-type: none"> <li>Applied on gross revenue of oil and gas at market price minus allowable deductions</li> <li>PRRT rate is 40% and excludes onshore assets as of 2019 (most of these projects never paid appreciable PRRT hence no significant change observed)</li> </ul>
Excise duty	<ul style="list-style-type: none"> <li>Levied on production / revenue at the time of production</li> </ul>	<ul style="list-style-type: none"> <li>Only applied to fields under state jurisdiction and the North West Shelf project</li> <li>Excise duty ranges between 0 and 55%</li> </ul>
Company tax	<ul style="list-style-type: none"> <li>Levied on taxable income of all companies (i.e. not specific to only those in the oil and gas sector)</li> </ul>	<ul style="list-style-type: none"> <li>Applied on gross oil and gas revenue minus allowable deductions including PRRT</li> <li>Company tax is 30% (except for 'small business' companies which are subject to a reduced rate of 27.5%)</li> </ul>
Indirect taxes	<ul style="list-style-type: none"> <li>Indirect taxes incorporate customs duties and Goods and Services Tax (GST)</li> </ul>	<ul style="list-style-type: none"> <li>GST is a value-added tax amounting to 10% and is levied on the payments for goods and services consumed</li> <li>Import duties are levied at the rate of either 0% or 5% (for certain types of goods)</li> </ul>

Source: Various.

As highlighted in Figure 7, the oil and gas industry contributes billions of dollars each year in tax revenue to the government. Tax payments peaked in the early 2010s, reflecting strong production in these years. While corporate taxes dominate the industry's tax contribution, production excise payments, royalties and fees have been rising recently.

Figure 7: Tax contribution of the industry, 1991-2018

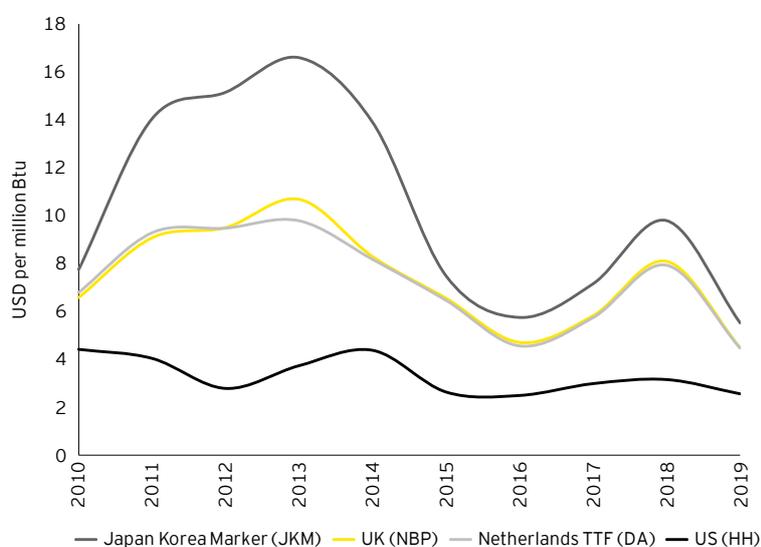


Source: APPEA Financial Survey.

## 2.4 Industry challenges

Moving forward, the industry faces a more challenging environment, particularly due to lower commodity prices. There has been a global decline in gas prices (see Figure 8) with recent estimates putting prices at decade-long lows, placing increased pressure on the industry. Under these conditions, Australia's export capacity and revenue could decline over the current financial year. The Office of the Chief Economist at the Department of Industry, Science, Energy and Resources forecasts LNG export earnings to decrease to \$35 billion in 2020-21.

Figure 8: Global gas and LNG price trend



Source: bp (2020), Statistical Review of World Energy June 2020.

In addition, the competition for capital for upstream development is also becoming more competitive. Australia is now competing for capital with developments where projects are cheaper

and more flexible. These include projects in places such as the US, Russia, Nigeria and Canada. The need to remain internationally competitive will be a challenge for Australia's oil and gas industry over the next decade.

### 3. Managing the economic challenges of COVID-19

COVID-19 is the most damaging economic shockwave to hit Australia and the global economy since the second world war. Every major economy has contracted sharply because of the pandemic, and Australia has plunged into a sudden and deep recession, our first in 30 years.

In the face of this turmoil, the oil and gas industry has fared well, maintaining production and export revenues and continuing to support thousands of Australian jobs. This chapter discusses how oil and gas businesses quickly adjusted to different operating requirements and underpinned Australia's trade performance while large parts of the economy shut down.

Going forward, Australia will be heavily reliant on its world-class resource industries and industrial base as the long process of repairing a fractured economy begins.

#### 3.1 Elements of the crisis

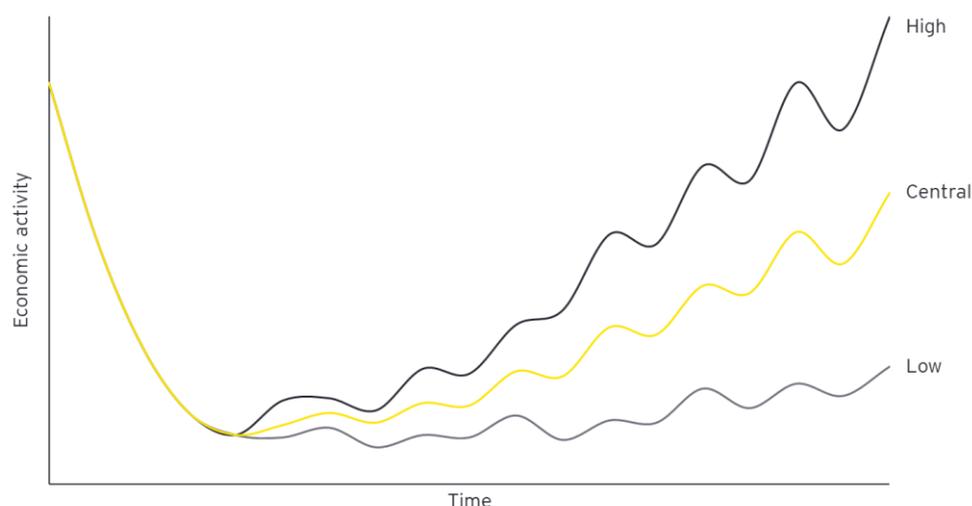
The economic crisis is historically unique. It is neither a business cycle recession nor a financial crisis. Rather, the crisis is a massive supply shock in which vast swathes of the economy have been shut down, directly or indirectly, coupled with domestic and international border controls to manage the spread of the virus. Economic activity and confidence have deteriorated sharply.

The economic scarring from COVID-19 is likely to persist for many years, with considerable short-term risks for wages, unemployment and the Budget. Some key structural factors will influence how quickly and in what shape the economy emerges from the crisis:

- ▶ As the pandemic emerged in early 2020, the Australian economy was relatively robust (it had grown uninterrupted for 29 years) but was showing signs of weakness. Business investment outside of the resource sectors had been soft for several years, and productivity and real wage growth were low.
- ▶ Job losses have been heavily concentrated in the private sector, not the public sector. With a massive ramping up in government spending to protect jobs and support household incomes, there has been an effective (and unsustainable) increase in the public sector's share of the economy.

The ability of the private sector to rebound and begin investing and hiring once restrictions are lifted and government support measures wind up will be pivotal to Australia's economic recovery. The oil and gas industry, and other primary industries activities, will play a major role in this process. Under a 'sawtooth' economic recovery path (as represented in Figure 9) – where no effective vaccine is found and distributed in the short term and governments fight to suppress outbreaks – there will likely be a slow-paced and uneven recovery profile.

Figure 9: Possible 'sawtooth' economic recovery paths for the Australian economy



Source: EY analysis.

### 3.2 Industry responses to keep the lights on

Almost all Australian enterprises have instituted changes to the way they do business as a result of COVID-19. This includes physical distancing and hygiene practices, changed operating hours, innovation and workforce changes to limit the spread of the virus and concentrate on commercial sustainment.

As the crisis exploded in early 2020, Australia's oil and gas industry responded rapidly. With a clear focus on the health and safety of people, an immediate priority was maintaining core operational activity and mobilising workers to meet new logistics constraints. As a high-tech capital-intensive industry with key facilities in regional and remote areas, there are acute commercial risks if critical staff or equipment are unavailable. APPEA and the wider resources sector worked together on national COVID-19 response principles and protocols. As part of the general response framework, key measures undertaken by the industry involved:

- ▶ In line with government guidance and border closure regulations, Australian oil and gas companies introduced social distancing requirements, gathering and capacity limits, increased hygiene protocols, and additional controls for higher risk individuals. Companies also established pandemic response teams to rapidly manage operations during the crisis and changing restrictions.
- ▶ Many companies introduced mandatory thermal screenings, temperature checks, and medical surveys to enter sites and offices.
- ▶ Critical on-site operating teams were segregated, along with external visiting restrictions. Alternate rostering models also assisted workflow management with border restrictions to accommodate self-isolation requirements.
- ▶ Some companies required workers to isolate for two weeks ahead of an extended working period to ensure facilities remained virus-free. Following a shift which could be around four weeks, workers returned home for two weeks rest.
- ▶ Other companies created 'islands' through isolating logistics and staffing plans for key offshore gas facilities which restricted interactions to only within the crew throughout the entire shift.
- ▶ Recognising the pandemic's impacts beyond their own operations, companies have adjusted arrangements with contractors and suppliers, including reducing payment terms.

- ▶ Perhaps the largest challenge faced by the oil and gas industry has been the management of fly-in, fly-out (FIFO) workers. International travel has almost entirely been closed and domestic travel heavily restricted under State and Territory guidelines. In line with restrictions, companies worked with their staff to shift or relocate for periods of time, incentivising relocation, whether temporary or permanent. Assistance was also provided to help relocate FIFO family members where needed.

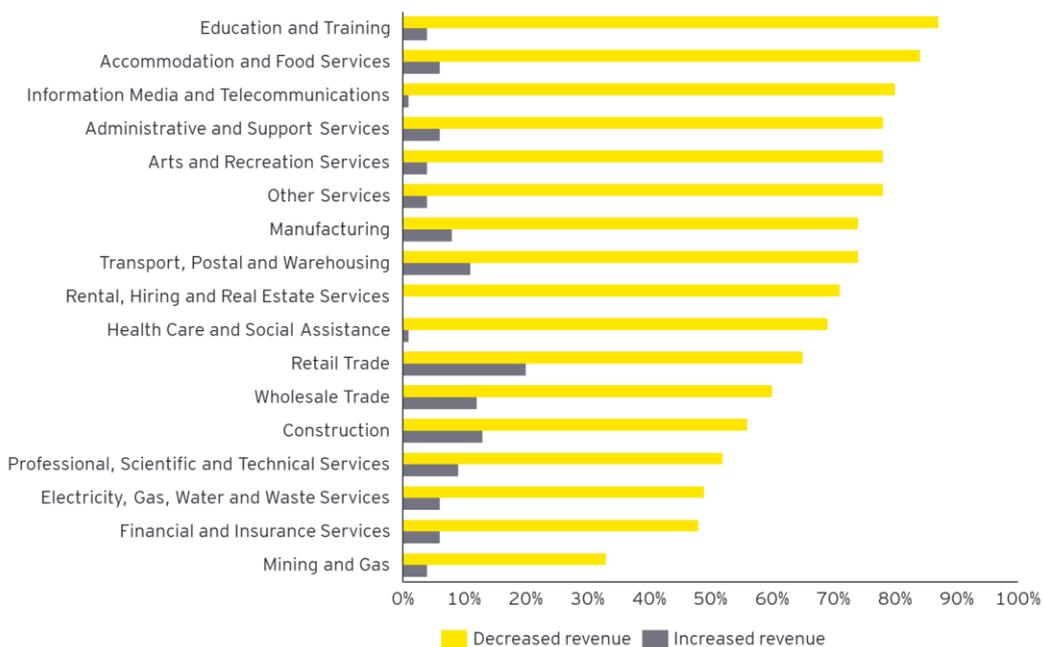
These responses enabled oil and gas businesses to maintain production right across the country and underpin Australia’s resource and energy performance while large parts of the economy were frozen. At the release of this report, there have been no recorded COVID-19 cases at Australian oil and gas operations during the seven months in which protocols have been in place.

### 3.3 Critical economic support and diversification

While many parts of the Australian economy continue to experience extreme hardship during the COVID-19 crisis, some industries have been prime movers and have helped limit the ongoing economic damage to the country.

The most heavily impacted sectors have been in services such as arts and recreation services, accommodation and food services, and education and training (see Figure 10), where revenues and employment have plummeted.

Figure 10: Proportion of firms that experienced a change in revenue in June 2020 compared to June 2019



Source: ABS, 5676.0.55.003 - Business Indicators, Business Impacts of COVID-19, June 2020, Table 6.

In contrast, Australia’s oil and gas businesses have been remarkably resilient. The industry, despite trying external conditions, increased production in 2019-20 by 10% from the previous year, with the value of production exceeding \$82 billion (see Table 3).

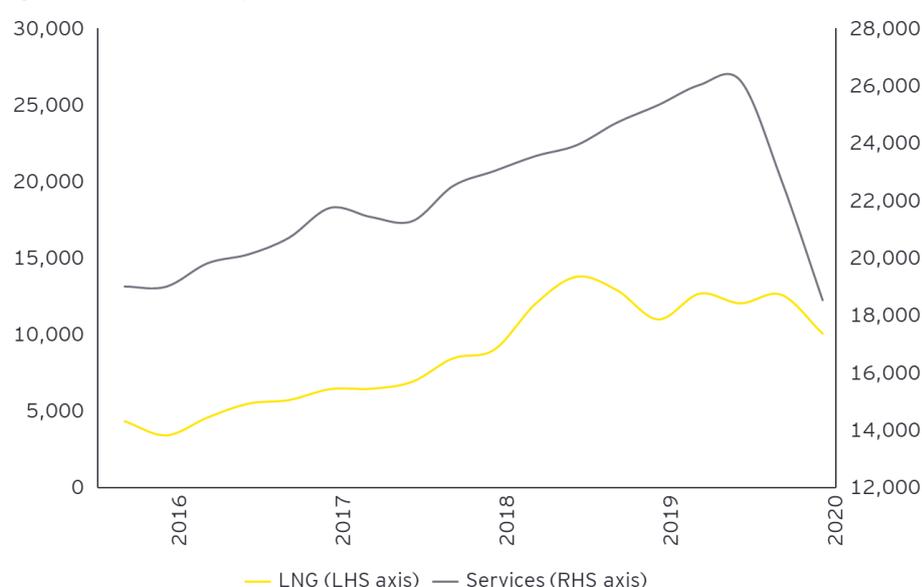
Table 3: Economic contribution of Australia's oil and gas industry

Variable	Description	2018-19	2019-20	Change from 2018-19 (%)
Production	PJ	6,243	6,864	10
Value of production	\$m	83,099	82,217	-1
<b>Direct effects</b>				
Value added	\$m	55,619	68,718	24
Exports	\$m	59,848	57,936	-3

Source: EY analysis based on data from the Department of Industry, Science, Energy and Resources (2020), Department of Industry, Science, Energy and Resources (2020) and Australian Bureau of Statistics (2020).

The industry's export performance, which comprises around 20% of Australia's export revenues, has also help up during the crisis. As shown in Figure 11, LNG exports have remained relatively buoyant in stark contrast to Australia's services exports which have decreased dramatically over the last six months.

Figure 11: Petroleum exports (\$ millions)



Source: Australian Energy Regulator (2020), State of the Energy Market 2020.

Managing through the COVID-19 pandemic, value added generated by the oil and gas industry, which measures the industry's contribution to GDP, was up 24% on the previous year. From a macroeconomic standpoint, the oil and gas industry contributed 4% of GDP in 2019-20, an increase from 3% in 2018-19 (EY analysis). (For perspective, 1% of Australia's economy is currently valued at around \$19 billion.)

This economic support over the last six months highlights the role which Australia's industrial base, including oil and gas, mining and other capital-intensive enterprises, much of which are regionally or remotely located, play in generating lucrative export streams and diversifying the economy. In contrast, the most devastated areas of the economy from COVID-19 have been those which are heavily dependent on services. This is a pattern which has played out across advanced economies.

The role of diversification, as always, is to enable businesses and nations alike to manage risk, including unexpected risks like the massive reallocation shock from COVID-19. Beyond the crisis, as Australia begins the arduous process of economic repair, continuing strong performance by our export powerhouses like the oil and gas industry will be vital. The industry's outlook is examined in Chapter 4.

## 4. Production and investment outlook

The next wave of investment in oil and gas has strong foundations, however, the investment landscape is riskier and more challenging than the previous decade. There are several factors contributing to this. The economics of undergoing projects is finely balanced – they involve long lead times, substantial upfront costs and patient capital. Adding to this is the fact that lower gas prices and competition for capital within firms are affecting the scale and scope of projects. There are also higher hurdle rates and global competition for mobile capital has intensified.

Compared to places like the US, Middle East and Africa, Australia has much higher development costs. There is generally strong competition within a company's portfolio, with individual projects trying to secure capital. For US companies in Australia, our projects compete with those in the 'lower 48' of the US – a region categorised by low cost drilling and scale economies, extensive pipeline access, supportive regulation, risk tolerant capita and superior geology. Over the next year alone, Australia is competing for foreign direct investment (FDI) with projects in North America, East Africa, Qatar, Russia and Papua New Guinea.

The increase in international competition for FDI has also coincided with a reduction in gas prices, as highlighted in Chapter 2. This decrease in global gas prices reduces the potential profitability of new developments and makes the economics of projects even more marginal. As producers lower their price assumptions it means there is a more pressing (and challenging) need to demonstrate that projects can succeed at the bottom of the price cycle.

As a result of these challenging conditions, we are seeing a shift away from the mega-projects of the past and a transition towards smaller, incremental projects (often in mature basins). Companies are now less likely to embark on new phases of greenfield investment. The changing nature of the investment pipeline means that companies are making decisions to lower risks – particularly while prices are low – and optimise existing resources, while also delivering capital efficiencies. Another important consideration is the need for exploration to be well targeted in a low-carbon world. This forms part of the investment decision and prospective discoveries that will likely need to integrate with carbon capture and storage. Indeed, carbon capture and storage was recently identified as a priority technology with the potential for transformational economic and emissions outcomes, as part of the Australian Government's Low Emissions Technology Statement. (Other priority technologies include clean hydrogen, energy storage, low carbon steel and aluminium, and soil carbon.)

In the current climate, the effects of falling prices and COVID-19 have already manifested, with many companies writing down their gas assets and downgrading producers' capital spending. These challenging conditions have resulted in delays in investment decisions for large projects and others being put on ice (such as Shell's Crux project and Santos' Barossa gas project). There is the risk that the longer these projects are delayed, the less likely they are to continue. If conditions do not improve, this could lead to project cancellations and losses in foregone investment. It is therefore important that we capitalise on the next wave of investment opportunities, or Australia faces some risk of being priced out of the LNG market.

### 4.1 Developing the investment outlook

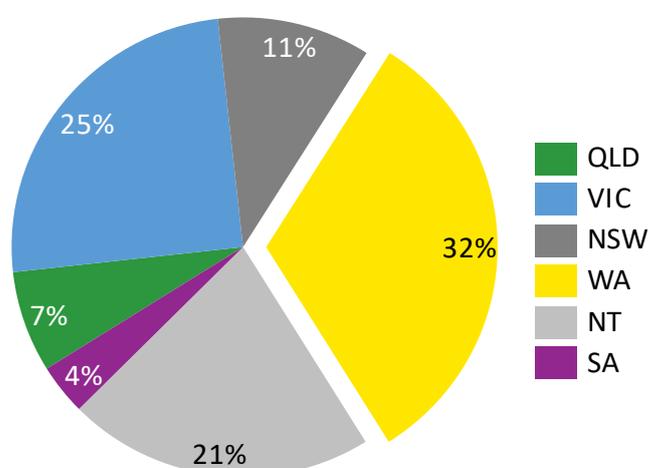
There are many oil and gas projects that are either committed, under construction or being considered in Australia. EY analysed various sources, such as media articles, company reports, industry outlook reports and government publications, to construct a database on these committed and potential investments. For each project, the analysis includes information on the proponent, gas field, development date, production volume, development cost and type of gas production to be undertaken. The investment outlook database also includes details on historical production and capital expenditure for existing projects.

The analysis identified almost 30 potential or committed projects. These projects vary in size, scope and location – with smaller projects like exploration by Lakes Oil in Wombat Field having about AUD\$4 million of expected capex, while large-scale projects like Narrabri totalling AUD\$3.6 billion in capex. Key projects in the analysis include:

- ▶ Woodside’s Browse Project (AUD\$50 billion in capex) and Scarborough (AUD\$16 billion in capex)
- ▶ Arrow Energy’s Surat Gas Project (AUD\$10 billion in capex)
- ▶ Santos’ Barossa Project (AUD\$6.5 billion in capex) and Dorado Project (AUD\$2.2 billion)
- ▶ Shell’s Crux Project (AUD\$2 billion in capex).

The breakdown of projects, by location, is shown in Figure 12. Most of the projects are in Western Australia, and a number of others are situated in Victoria and the Northern Territory. This is reflective of the potential for projects in new gas provinces like the Beetaloo Basin and there are many opportunities in the Great Australian Bight. There has also been an increase in activity in the Otway Basin, particularly by players like Beach Energy.

Figure 12: Geographical location of projects



Source: EY analysis.

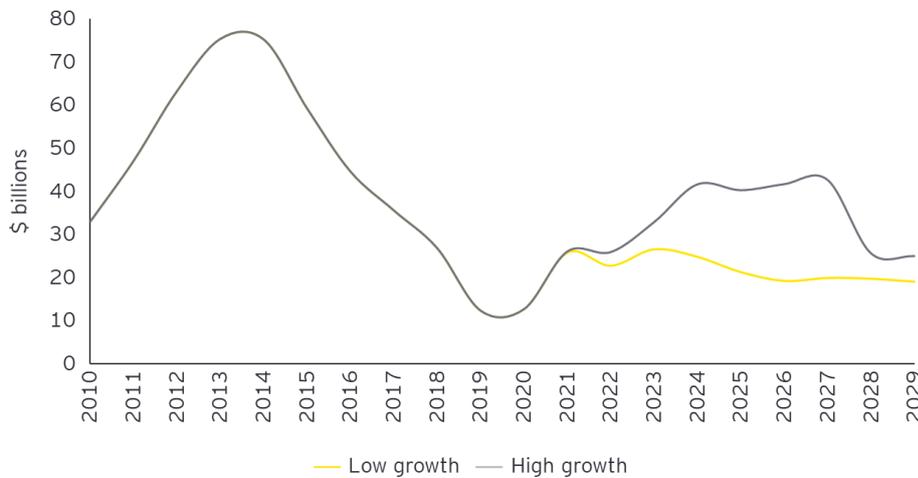
## 4.2 Investment pipeline

EY utilised the database to develop a future investment profile for the oil and gas industry (see Figure 13). This showcases the likely levels of investment for the industry under two different growth trajectories:

- ▶ **Low growth** – Encompasses the levels of investment for projects that are currently under development or have very high levels of investor commitment. There is also a strong pipeline of investment to maintain production volumes for existing projects, including drilling additional CSG wells to feed LNG trains. Therefore, this path incorporates the capital required to sustain existing facilities, projects and fields. Examples of committed or underway projects include the Surat Gas Project, West Barracouta Project and Ironbark Well Project.
- ▶ **High growth** – Showcases the potential investment path if more speculative investment is secured. This scenario builds on the low growth case, to capture projects that have higher levels of uncertainty associated with their development. In doing so, this investment path

highlights a potential frontier that could be realised under favourable industry conditions. Projects in this trajectory include Narrabri, Scarborough, Browse, Project Flow and the Wombat Field Project. In addition, we have included investment (outside of the oil and gas industry) that is contingent on the approval of these projects. For example, about \$2 billion of planned spending on NSW manufacturing projects is linked to the approval of Narrabri.

Figure 13: Investment pipeline



Source: EY analysis.

After 2020, investment deviates under the high and low growth paths (see Figure 13). For the low growth trajectory, investment peaks in 2023 at \$27 billion (see Table 4), before tapering off over time as locked-in investments become less certain. The high growth frontier builds upon the low growth case, with investment particularly high between 2024 and 2027 – peaking at \$43 billion (see Table 4). In subsequent years, investment falls away as future investment decisions become more uncertain. Under the two scenarios, investment fails to reach the peaks seen in the early 2010’s, reflecting the changing nature of the industry.

Table 4: Investment pipeline (\$ billions)

Scenario	2021	2022	2023	2024	2025	2026	2027	2028	2029
Low growth	26	23	27	25	21	19	20	20	19
High growth	26	26	33	42	40	42	43	26	25

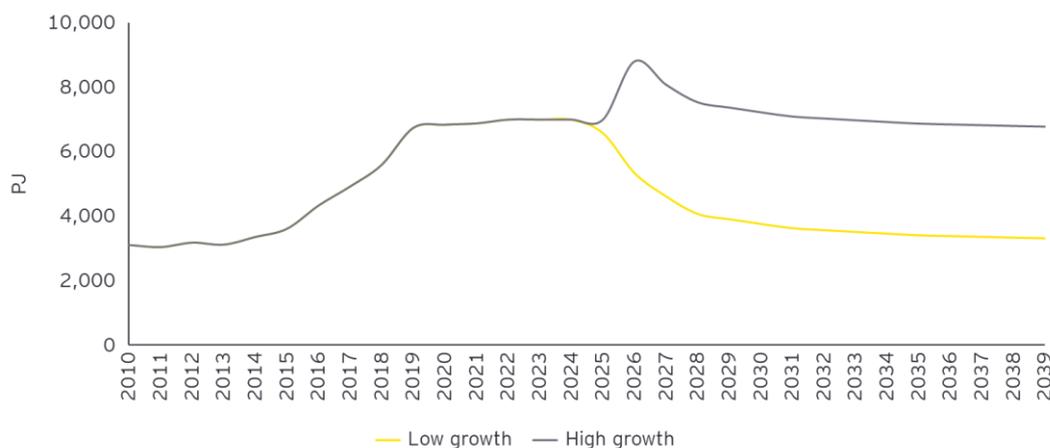
Source: EY analysis.

### 4.3 The outlook for oil and gas production

A similar trajectory has been developed to highlight the likely production profiles under the two scenarios. For each project in the dashboard, the yearly production was calculated and converted to petajoules (PJ). This allowed us to build up a profile of projected production over time (see Figure 14). Our analysis factored in several considerations:

- ▶ Supply from proposed import terminals is not included in the production profile. Instead, the additional supply associated with these terminals was recorded separately. Moreover, some of these import terminals are competing against one another and hence, we have also tried to capture this idea of mutual exclusivity in the analysis. There is flexibility in the dashboard to capture these nuances.
- ▶ Production was categorised by purpose – for local consumption or to export. This division was based on the Western Australian domestic gas reservation policy, as well as other factors like the type of gas produced. In both the high and low growth scenario, about 37% of production was classified as being for domestic use and 63% was to be exported.

Figure 14: Production outlook



Source: EY analysis.

Under the high growth scenario there is potential for strong levels of production (see Figure 14). This is reflective of the potential under a pro-growth agenda, where the industry looks beyond maintaining existing projects and instead looks towards opening and exploring new basins. While this comes with higher risk, there is the opportunity for significant upside.

Under both the high and low growth case, the average projected production is higher than historical levels – 5.8% higher than the 20-year average for the low-growth and 64% for the high growth. As the levels of capex taper off, so too does the production levels. For the high growth case, production peaks at 9,000 PJ in 2026, before slowly falling (see Table 5). In contrast, production falls from 2025 along the low growth path.

Table 5: Projected production (PJ), selected years

Scenario	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Low growth	6,882	5,343	4,617	4,073	3,910	3,763	3,630	3,571	3,514	3,461
High growth	6,882	8,807	8,082	7,537	7,374	7,227	7,095	7,035	6,979	6,925

Source: EY analysis.

## 5. Policy and regulatory challenges

Australia's success in developing its world-class oil and gas resources has historically been well-supported by a comparatively stable policy and regulatory environment. As an investment environment, Australia provides the benefits of an advanced economy, with relatively low sovereign risk and superior access to skilled labour and capital markets, coupled with significant resource prospectivity. Indeed, the combination of stability and resource materiality is a strong driver of the large-scale gas projects which have been delivered over the last decade.

The investment landscape for new oil and gas projects is, however, becoming more challenging. Some major project investment factors include:

- ▶ Future developments (especially offshore) are less likely to involve integrated development of upstream and downstream infrastructure.
- ▶ There is a stronger focus on opening new fields as infill, which tend to be smaller, more distant, and/or more technically complex, or the incremental expansion of existing infrastructure. The cheap easy-to-recover gas is mostly gone.
- ▶ Projects are becoming more marginal and, commensurate with a riskier profile, they need to meet higher hurdle rates.
- ▶ There is aggressive competition from lower-cost and stable jurisdictions, and global capital can often achieve better returns in other producing countries.

In large part, these project factors reflect declining production from foundation projects and the challenging economics of developing greenfield facilities where there is already significant installed LNG capacity and a softer market environment.

This places increased importance on establishing policy settings which can attract investment in the oil and gas industry over the long term. Key aspects of Australia's policy and regulatory framework were put in place when gas projects were much larger and underpinned by buoyant prices, and such policies may not be the best approach in the current market environment.

Australia's ability to secure the next wave of investment in oil and gas exploration and production will be highly dependent on establishing new policy settings which can improve policy certainty, lower costs and enhance project commerciality.

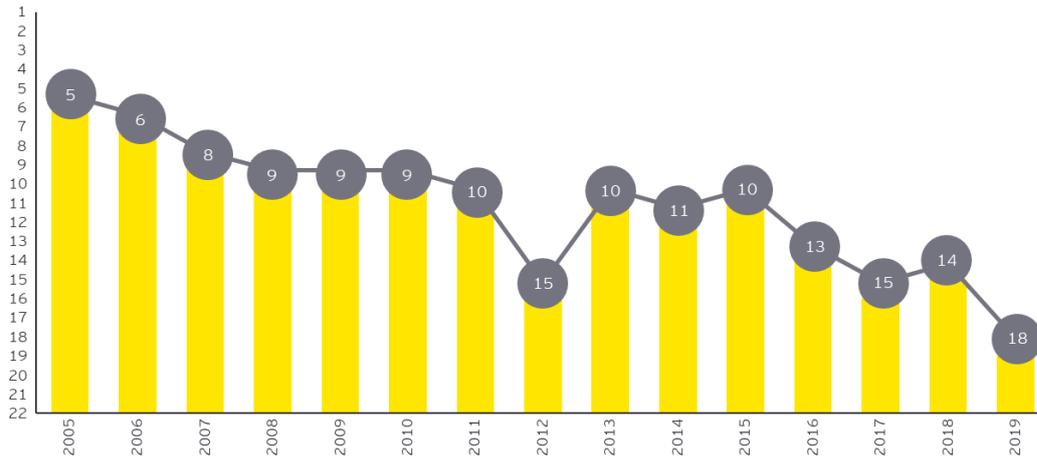
### 5.1 Regulatory approvals

Australia's oil and gas businesses operate in a complex regulatory landscape. All levels of government have a role in creating and administering frameworks governing the approval of project investments and licenses to operate.

While major resource projects need rigorous regulatory processes, there are longstanding concerns that these can be improved to lessen unnecessary burdens and improve investment outcomes. Delays in approving and constructing major projects in the resources sector can disadvantage proponents by increasing holding costs and adding to investment uncertainty.

In an increasingly globalised economy, regulatory delays and cost pressures can deter investment, and heighten the risk of businesses pursuing overseas projects to take advantage of more favourable regulatory arrangements. Australia's global ranking as an easy place to do business has been slipping. In 2005, the World Bank ranked Australia 5<sup>th</sup> on its Ease of Doing Business Index. In 2019, Australia ranked 18<sup>th</sup> (see Figure 15 below).

Figure 15: Australia's ranking in World Bank - Ease of Doing Business



Source: World Bank.

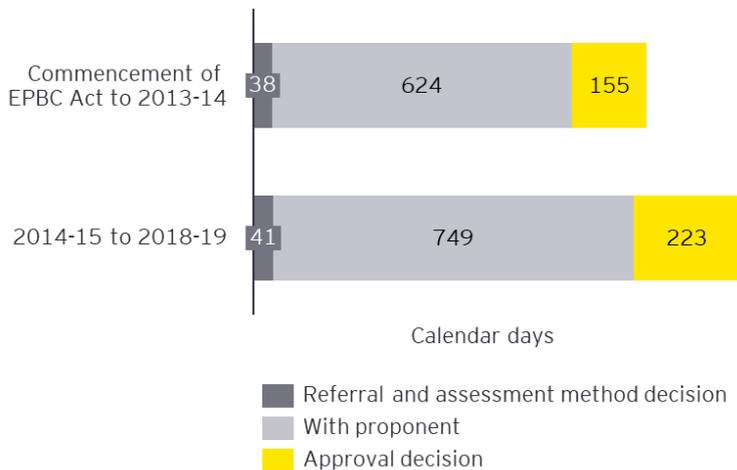
These risks were also recently underscored by the Productivity Commission’s review of regulation in the resources sector which concluded that regulatory processes remain unduly complex, duplicative, lengthy and uncertain – and may be becoming more so. Ultimately, this erodes the economic opportunities for workers and communities which flow from investment.

There appear substantial opportunities to improve our competitive position by lowering regulatory costs and speeding up approval timeframes for oil and gas projects.

#### Environmental approvals

A key regulatory challenge involves improving the time required to obtain environmental approvals. The duplication and overlap of federal and state responsibilities within the Environmental Protection and Biodiversity (EPBC) Act, Australia’s major plank of environmental regulation, has been identified as a significant (and worsening) cost and time impediment for resource and gas projects. The time taken for environmental approvals under the EPBC Act has increased markedly over the last five years (see Figure 16), with major cost implications for project proponents.

Figure 16: Average number of days taken for approvals processes under the EPBC Act for resource projects



Source: Unpublished data, Department of Agriculture, Water and the Environment.

Problems with how the EPBC Act is designed and administered have been highlighted by the Productivity Commission in its current review of resource regulation. The Commission asserted that the costs of project delays often dwarf the direct costs of regulation, both materially reducing the net present value of projects that proceed and deterring potential investments.

The key issues identified for reform, as identified by the Commission, include:

- ▶ **Approval timeframes** – The Commission identified that the requirement for projects to obtain multiple approvals, and often at both a State/Territory and Federal level, leads to protracted, sequential approval timeframes, duplication and inconsistent requirements. Approvals and post-approvals (referred to as 'nested' approvals) are unpredictable and lengthy, with concerns that some conditions are inappropriate.

Leading practices to address delays in nested approvals include providing applicants with clear guidance on the type and quality of information that post-approval documentation would need to include. Further, decisions in the post-approval stage should be subject to timelines, and the regulator's performance against those timelines should be evaluated and publicly reported.

The Commission also identifies leading practices including placing limits on the use of 'stop the clock' provisions and better use of deemed decision provisions to allow for decisions not made within statutory timeframes.

- ▶ **Focusing on more risk- and outcomes-based regulation** – The Commission noted the current 'rigid one-size-fits-all' approach is burdensome and does not reflect the increasingly diverse types of resources projects seeking approval. It resulted in proponents accepting ill-suited conditions to avoid further delays, and an increasing reliance on post-approval conditions and renegotiation of initial conditions.

The Commission recommended regulators assessing resources projects move towards regulation that is both:

- risk based – so project evaluations are aligned with the size and likelihood of environmental risks the project creates
- outcomes based – so regulatory conditions set out the outcomes or standards that must be complied with, rather than prescribing specific steps that must be taken to comply.

The leading practices the Commission identified involved early engagement with proponents to identify key risks, with impact assessments and approval conditions then focused on risk management, rather than prescriptive operating conditions. The Commission also recommended greater accountability and transparency be provided by way of regulators publishing target assessment and approval timeframes, with reporting against those benchmarks.

- ▶ **Commonwealth approvals and jurisdictional coordination** – A key finding is that the referral process for the EPBC Act, in relation to the water trigger that applies to coal seam gas projects, creates unnecessary regulatory burden. It notes there is no compelling evidence to suggest the water trigger has filled a significant regulatory gap.

The Commission recommends that, just as bilateral assessment agreements are effective in reducing regulatory burden, the EPBC Act should enable the negotiation of bilateral approval agreements between the Federal Government and States and Territories. Further, bilateral assessment agreements should be subject to additional commitments to address inconsistencies and overlap in project approval conditions.

Initiatives to reduce red and green tape, while appropriately managing project development risks, will help remove unnecessary barriers to investment.

As highlighted by the Productivity Commission and the current independent review of the EPBC Act, there are strong opportunities to improve regulatory regimes by adopting clear risk-based frameworks. This would identify and assess the risk associated with gas projects and adjust regulatory requirements accordingly. Where gas projects and their underpinning production techniques have established proof of concept and a strong environmental safety record, regulatory compliance would be lighter, and approval timeframes accelerated.

Looking forward, there have been some welcome advancements. The Commonwealth Government has signalled its intent to provide a single touch approvals process under the existing EPBC Act to significantly streamline duplicative approval processes. Under the Government's introduced bill to amend the EPBC Act, there is a devolution of environmental approvals to the States and Territories. This will enable jurisdictions to make a single approval decision accounting for both state matters and matters of national environmental significance. The Independent Review of the EPBC Act also remains ongoing and may result in further changes to the EPBC Act.

Australia's achievements in commercialising gas production (both conventional and unconventional) over decades should, in principle, be reflected in how all levels of government manage assessment and approval processes. Recent successes in adjusting regulatory requirements and fast-tracking project approvals as part of COVID-19 emergency responses showcase how regulatory regimes might function under more normalised conditions. Low cost and speedy project approvals, without compromising standards, will be fundamental to shoring up Australia's competitive position.

### *Decommissioning*

As large and long-lived capital investments, many oil and gas projects involve significant decommissioning activities when they reach the end of their productive life. Decommissioning encompasses the removal or reuse of project structures and any other associated installations at end of life.

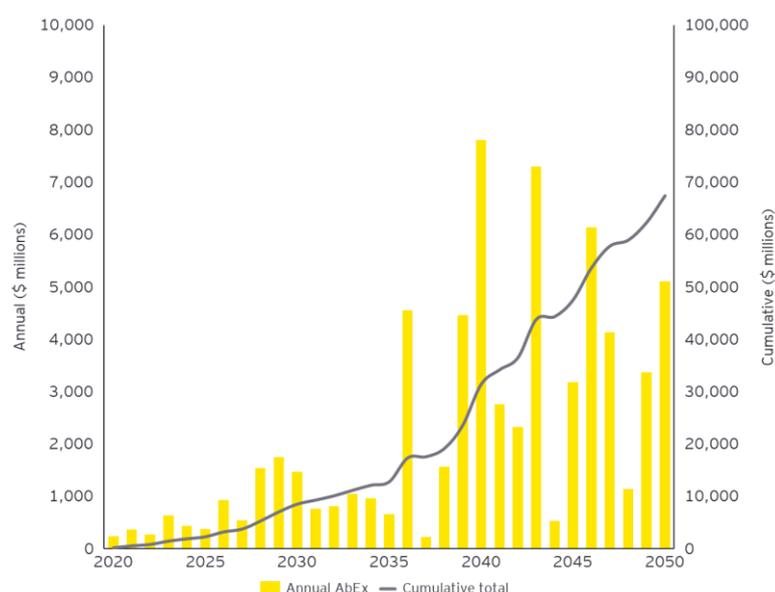
Despite a large expansion of the nation's gas production capacity over the last decade (see Chapters 4 and 6), many of Australia's legacy gas assets, especially offshore facilities, are more than 20 years old. They are entering a phase where they require extra attention and close maintenance, and many may soon be decommissioned. By 2026, over 65 offshore platforms may need to be decommissioned, with the total decommissioning cost over the next 30 years potentially exceeding \$60 billion (see Figure 17).

A decommissioning plan must be in place to remove, in a timely manner, all property and equipment when it will no longer be used. If removal is to be delayed, or full removal is not practicable, then alternative arrangements must be generally be demonstrated and approved by the relevant regulator. For offshore facilities, which are regulated by NOPSEMA, this will typically involve arrangements that deliver equal or better environmental outcomes and can be done safely.

While gas producers' provision for decommissioning as part of their investment and field development plans (including how this might impact project hurdle rates), the management of very aged assets involves major commercial risks. In Australia, decommissioning at scale presents an emerging challenge, with minimal industry experience, in contrast to operations in the Gulf of Mexico and the North Sea.

An important issue is that domestic oil and gas projects, which can operate for over 30 years, can be exposed to new environmental standards for remediation or decommissioning which were not conceived or considered during investment. The prevalence of Australia's ageing gas asset base coupled with the very long-term nature of inherent risks, which extend long after a well is plugged and abandoned, present key regulatory issues for the industry.

Figure 17: Total abandonment costs faced by Australia's upstream oil and gas industry



Source: Wood Mackenzie (2020), Australia Oil & Gas Industry Outlook Report.

### Foreign investment approval

Australia is a major capital importing country and a significant proportion of oil and gas companies operating in Australia either draw heavily on foreign investment or are owned entirely by foreign investors. The resources sector is the largest destination for foreign direct investment (FDI), which totalled over 35% of Australia's total FDI in 2019 (ABS Cat. No. 5352.0).

Foreign investment proposals require approval if they meet certain screening criteria. For oil and gas projects approval may be required to acquire an interest in a tenement, the underlying land, or an operational business, or to start a new Australian business (FIRB policy guidance). Screening thresholds vary by sector and by investor destination, as well as for foreign government investors.

The Treasurer can prohibit foreign investment proposals found to be contrary to the national interest or can impose conditions on an investment to address national interest concerns. When making decisions on foreign investment, the Treasurer receives advice from the Foreign Investment Review Board (FIRB). FIRB approvals by sector and within the resources sector between 2015 and 2019 are shown in Table 6 and Table 7. In 2018-19, oil and gas related foreign investment comprised about 24% of total FDI in Australia's resources industry.

To safeguard the national interest as part of the Government's management of the COVID-19 pandemic, the dollar value threshold for any foreign investment bid that must be screened has been lowered to zero. Previously, the general threshold for FIRB scrutiny was \$275 million or \$1.2 billion for free-trade agreement partner countries in non-sensitive businesses (which includes oil and gas industry).

As part of the new arrangements, the deadline for government decision-making on transactions has been extended from 30 days to up to six months. The temporary \$0 threshold for all foreign investment deals is likely to continue into next year to remain in place during a wave of expected bankruptcies when insolvent trading protections are slated to wind up.

While approvals do not aim to impede foreign investments (investments are rarely rejected), FIRB decision-making timeframes increase costs for overseas investors and can be an additional source of uncertainty. Importantly, these issues may well be amplified by the Government's temporary lowering of investment thresholds and increasing process deadlines, especially if there is any material backlog in FIRB approvals as a result of increased volume of approvals.

Table 6: Total FIRB approvals by sector

Industry sector	2015-16		2016-17		2017-18		2018-19	
	No.	\$ billions	No.	\$ billions	No.	\$ billions	No.	\$ billions
Agriculture, forestry and fishing	227	4.6	223	7.0	201	7.9	197	7.3
Finance and insurance	19	13.5	25	3.8	37	6.0	26	6.3
Manufacturing, electricity and gas	66	56.6	73	40.9	95	16.6	99	36.7
Mineral exploration and development	180	27.6	140	15.9	115	17.4	121	16.9
Services	153	23.5	215	56.5	185	63.2	245	76.0
Real estate - commercial	606	49.7	465	43.7	391	39.5	487	73.0
Real estate - residential	40,149	72.4	13,198	30.0	10,036	12.5	7,513	14.8
<b>Total</b>	<b>41,400</b>	<b>247.9</b>	<b>14,339</b>	<b>197.7</b>	<b>11,060</b>	<b>163.1</b>	<b>8,688</b>	<b>231.0</b>

Source: Foreign Investment Review Board, Annual Report 2018-19.

Table 7: Mineral exploration and development FIRB approvals

Sector	2015-16		2016-17		2017-18		2018-19	
	No.	\$ billions						
Coal	31	1.5	24	5.5	23	8.5	37	6.5
Oil and gas extraction	30	20.7	17	1.1	20	1.6	17	4.1
Metallic minerals	85	4.0	73	6.3	51	4.9	43	4.6
Non-metallic minerals - mining and quarrying	9	0.3	4	0.2	3	-	3	0.8
Exploration and other mining support services	25	1.2	22	2.8	18	2.4	21	0.9
<b>Total</b>	<b>180</b>	<b>27.6</b>	<b>140</b>	<b>15.9</b>	<b>115</b>	<b>17.4</b>	<b>121</b>	<b>16.9</b>

Source: Foreign Investment Review Board, Annual Report 2018-19.

## 5.2 Managing community engagement to unlock new oil gas provinces

The commercialisation of highly prospective new oil and gas provinces such as the Clarence Basin and the Great Australian Bight has shown to be extremely challenging. Alongside the risks of frontier exploration and development there is increased focus by investors on the role of the industry in a carbon constrained world.

Proponents have also been confronted with highly coordinated groups opposing the developments, typically on environmental grounds. While approval requirements need to consider the views of the community and risks inherent to projects, they are not well suited to managing the sheer influx of activist opposition which can be marshalled using social media.

The ability of activist groups to frustrate the development of new gas fields has important implications for international investment. If resistance becomes entrenched leading to project withdrawals, there is a risk that Australia is seen by global investors as being a too difficult, expensive and high-risk place to invest. The recent experience of the coal industry to develop new mines underscores how this can drastically limit longer term expansion of resource capacity.

Both government and industry can play a pivotal role in helping manage community sentiment, especially to facilitate frontier basin opportunities. These could involve measures to highlight the industry's outstanding record of safety and environmental stewardship, the economic benefits that

resource development provides to the country (which is discussed below), and the strategic gains from improving Australia's fuel security.

### 5.3 Tax settings

Australia's fiscal regime has generally supported development of the nation's oil and gas resources. Our record as a world leading resource exporter has been underpinned by a stable and transparent tax system. However, our ability to encourage mobile capital into Australia to build the resource base will depend on the future competitiveness of Australia's tax regime. Simply, foreign investors face many choices on investment destinations and opportunities will not come to Australia if returns are pushed down by a relatively high tax burden.

Tax is an important factor in the investment case for gas projects. Taxes limiting returns and are assessed in the evaluation of sovereign risk. Producers with legacy assets have concerns (managed well so far) about their exposure to policies which lower the returns they receive. Further, Australia's field mix is also changing, with the cheap easy-to-recover gas mostly gone. A number of future Australian projects are located in deeper water and further offshore than earlier developments. An increase in the tax burden could result in these discoveries being abandoned.

#### *Maintain stability in Australia's resource rent tax and royalty regimes*

Australian governments, consistent with many international jurisdictions, tax resource industries differently to other industries such as agriculture, finance, services or manufacturing. This is typically done by applying additional taxes or charges on top of general taxes like company tax. These additional taxes are levied for two key reasons:

- ▶ Non-renewable oil and gas resources and other minerals are publicly owned and so a tax or charge is applied to ensure the community receives an adequate return for the extraction of its resources.
- ▶ High quality resources may offer significant economic rents or profits above a level necessary to attract capital, labour and other inputs to discover and extract the resources.

An overview of the current tax arrangements applying to the industry, including profit and production-based taxes, are outlined in Table 2 (in Chapter 2.3).

A key pillar of industry tax regime is the Petroleum Resource Rent Tax (PRRT) which covers offshore oil and gas production such as the Gorgon, Prelude, Pluto and Wheatstone and the Bass Strait. The PRRT is a 40% tax levied on profits generated from petroleum resource projects. While it taxes profitable projects, the PRRT does not provide rebates for tax losses. Rather, tax losses are carried forward into future years at an uplift rate which are offset by future cash flows.

PRRT payments are heavily project dependent. Oil projects are typically profitable much earlier than gas projects as they require less capital expenditure and can commence production quickly. Their PRRT revenues are thus payable relatively quickly. In contrast, LNG projects often involve much larger capital expenditures and have longer payback periods.

The principles underpinning the PRRT regime suit the characteristics of oil and gas operations and have generally worked well over several decades. Indeed, a recent review of the PRRT by the Commonwealth Treasury found that the regime has not discouraged exploration or development. However, some refinements to the PRRT to better handle how field development risks and production licences are handled could improve its functioning.

A potential issue in the regime involves its capacity to accommodate conversion of an oil and gas project from a retention lease to a production lease and back to a retention lease. These processes, which reflect changing economic conditions and investors' ability to bring gas to market with adequate commercial return, can affect the certainty of relevant carried forward expenditures under the PRRT. This can be particularly problematic for smaller companies which often have more

of their capital reserves tied up in specific oil and gas investments and could ultimately result in some proven gas resources remaining undeveloped.

While functional refinements at the margin can support further industry development, there are major risks of fundamental changes to the PPRT on investment, especially in the current market environment where the global search for the best returns on capital is fierce. Stability in Australia's resource tax system is paramount. In particular, any increase in the PPRT regime, either through changing the rate in which profits are taxed or how exploration, development and operating costs are deducted, could undermine project commerciality and discourage future investment.

#### *Optimise capital depreciation arrangements*

Oil and gas projects are characterised by long lead and construction timeframes, substantial upfront costs and long payback periods. The economics of these projects, which involve heavy capital exposures, tends to be finely balanced. Arrangements to depreciate installed capital can thus impact project viability, especially in an environment in which competition for global capital is aggressive.

It is crucial that capital depreciation arrangements are strongly aligned with the economics of gas projects, especially as economic pressures change. In this respect, statutory capital write-off caps of 15 years for unconventional upstream projects and LNG projects and 20 years for conventional upstream projects (which were introduced in 2002) are typically well within the effective life of these projects, which can exceed 45 years. However, depreciation allowances only come into effect when a project is fully commissioned and starts producing. For projects with long construction periods (large LNG projects can take over six years to build), this has major timing implications for tax credits.

Importantly, some key competitor countries have shorter depreciation timeframes and enable installed capital to be depreciated after two years (e.g. Canada), rather than when a project is fully completed.

#### *Support efficient restructuring of joint ventures*

Oil and gas projects in Australia have traditionally been developed using joint ventures. JV relationships deliver over 80% of upstream investment projects.<sup>4</sup> JV structures provide a range of cost and risk advantages, enabling exploration and development costs to be spread, aggregation of adjacent projects and common-use infrastructure, access to technical expertise and capital pooling. They often involve asset swaps to give participants a proportionate share of each project's assets, and thus align commercial interests.

Given the long economic life of gas projects, JVs often need to be realigned to reflect participants' changing commercial priorities, as is currently occurring in the North West Shelf JV with Chevron looking to sell its 16.7% stake in the LNG project. These transactions, like the projects themselves, are complex and have major infrastructure valuation, revenue, capital raising and tax consequences. It is imperative that the tax treatment of JV realignments does not impede establishing capital efficient project structures which can maximise resource development opportunities.

To this end, there are concerns that the tax treatment of capital gains can potentially discourage (or slow down) beneficial JV transactions and impose a barrier on entry and exit. Particular issues relate to how project costs can be deducted and whether the shifting of interests is considered a realignment or divestment. As a principle, the tax system should enable JVs to be restructured in a clear, cost-effective and straightforward manner.

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<sup>4</sup> EY (2015), 'Joint ventures for oil and gas megaprojects'.

## 6. The economic gains from future industry growth

Under growth promoting policy regimes there is strong potential for Australia to capitalise on our world-class energy endowments through renewed industry investment in oil and gas. There is no doubt the industry has a strong role to play as Australia navigates through the current economic crisis and then begins the long-term economic recovery process.

A taxation and regulation reform regime, focused on driving investment, will provide an opportunity for the oil and gas industry to play a key role in supporting Australia's recovery - through generating employment, increasing tax revenue and stimulating activity throughout other parts of the economy. Under a low-growth path, the industry will still play an important role, however, the economic gains will not be as significant. Thus, the importance of growth-inducing policy reform is highlighted to spur investment and increase national economic output. Such an agenda will not only benefit the economy but will also improve the wellbeing of almost all Australians.

### 6.1 Modelling approach

EY's in-house computable general equilibrium (CGE) model, the EYGEM model, was used to provide an economic impact analysis of the likely economic contribution of the oil and gas industry under alternative industry growth paths. As discussed in Chapter 4, we have analysed the current investment pipeline to identify two potential growth paths for the industry:

- ▶ **Low growth** – Captures projects that are committed, or highly likely to proceed, as well as any sustaining capex related to current projects.
- ▶ **High growth** – Showcases the potential levels of investment if more speculative projects are undertaken.

The likelihood of these scenarios arising is highly dependent on the tax and regulatory settings. Issues with tax and regulatory imposts like the PRRT, capital depreciation arrangements, joint ventures and regulatory approvals are currently stifling potential industry growth (see Chapter 5 for more detail). Many parts of the system were appropriate for a different – but now outdated – style of oil and gas investment. The number of mega-projects, seen in the past, are subsiding. Instead, there has been a recent shift within the industry, with a focus on smaller, incremental projects and moving forward, new gas projects will need to meet higher hurdle rates. Hence, the costs of unnecessary tax and regulatory barriers are increasing.

As highlighted in Table 8, under a tax and regulatory reform regime which creates investment-inducing conditions there is wide scope for industry growth.

Table 8: Possible scenarios and related industry settings

Investment scenario	Low growth	High growth
Industry changes	Current policy settings maintained	High growth industry policy and regulatory reform
Taxation	No change to corporate taxation, resource rent taxes and investment allowances	New investment allowances supporting capital intensive investment
Regulation	Current regulatory settings are retained	Adjusting gas exploration restrictions and streamlined environmental approvals
Investment	Forward investment outlook consistent with consensus industry view	Strong industry investment
Broader economic parameters	Consistent view across scenarios on broader macro and external variables including the duration of the COVID-19 pandemic shutdown and staged lifting of restrictions, cross border trade and the effect of other country lockdowns, global oil prices and population growth etc.	

Source: EY analysis.

To analyse the economic contribution of the oil and gas industry, EY's whole of economy CGE model was used. EYGEM is a large scale, dynamic model of the Australian and global economies (see Appendix A for more information). Our analysis captures two important components that reflect the oil and gas industry's economic value:

- ▶ **Direct contribution of investment in oil and gas** – based on the value added by the industry, largely through investment and sales of production. The direct impacts are the largest part of the industry's contribution to the economy.
- ▶ **Flow-on impacts of investment in oil and gas** – the positive benefits to other sectors directly connected to the projects. This includes the flow-on benefits to workers, construction firms, suppliers to the gas projects, and tax and royalty revenue for governments. However, indirect effects also encompass offsetting negative impacts as a result of 'crowding out' of other parts of the economy (e.g. due to increases in the exchange rate).

The macroeconomic impacts of the industry development scenarios, detailed in Chapter 4, were examined using EYGEM. The modelling accounted for key aspects of the industry's investment and production profiles:

- ▶ **Export and domestic focused production have distinct economic linkages** – LNG projects such as those in the North West Shelf, Darwin or Gladstone are heavily export focused, with the bulk of future production committed for global sale in forward contracts linked to oil prices. Revenues for these projects are largely foreign earned. That said, the Gladstone LNG facilities, given their size and proximity to east coast gas networks, are also major suppliers of gas in the domestic market and have underpinning domestic gas sales agreements. In contrast to the mega LNG facilities, projects developed for domestic supply are not normally geared up with the technical capacity to supply gas for international shipping. Domestic gas projects can be considered as supplying a 'non-traded' product, which is primarily driven by its use as an input into electricity generation and other industrial processes.
- ▶ **There are different cost and efficiency impacts for locally supplied gas and exported gas** – The supply of gas to overseas and domestic customers involves different cost elements. This includes how long-term contracts are struck and in-built mechanisms for managing commodity volatility, shipping (netback) and pipeline costs, compression and regasification, and domestic regulatory requirements. For new domestic focused gas production, there are important supply-side impacts which help defray some of the fixed capital and regulatory costs of operating the existing gas system and lower costs for industrial and residential end users. The efficiency gains for domestic customers, which provide important economic spillovers, are recognised in the EYGEM framework.
- ▶ **Some infrastructure projects are dependent on new gas resource development** – The development of some gas projects in the 'high growth' scenario will, consistent with commercial announcements, determine the future of major complementary investments outside of the oil and gas industry. For example, about \$2 billion of planned manufacturing facility investment in NSW is dependent on the approval of the Narrabri gas project. These strongly linked investments have been included in the modelling inputs.

## 6.2 Estimated economic impacts

Australia's oil and gas industry plays an important role in supporting our economy, and looking forward, there is strong potential for significant upside, particularly under investment inductive tax and regulatory settings. This is reflected in the scale of the economic impacts estimated using EYGEM.

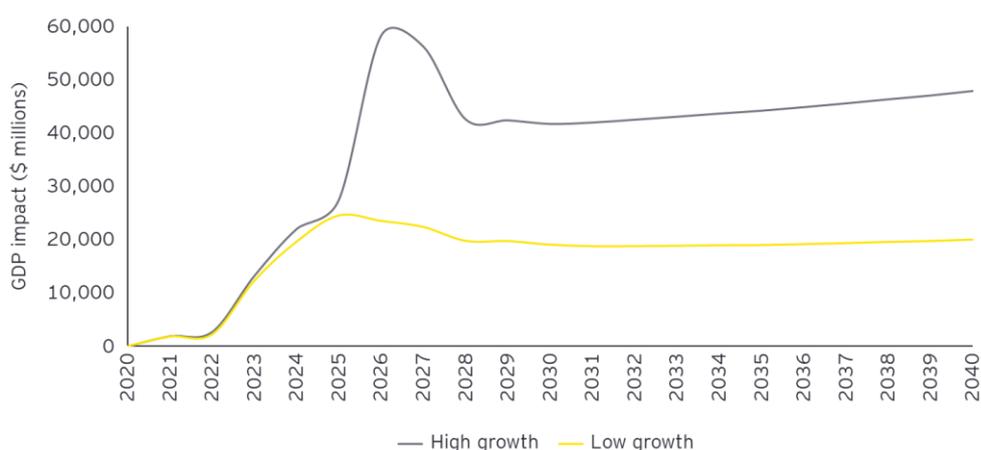
The size of the growth dividend is large, with GDP increasing significantly under the two growth scenarios (see Figure 18). Over the 20-year period, when long run gains from new oil and gas investments can be realised, the NPV of the total gains in GDP is estimated at \$176.4 billion for the

low growth scenario and \$352.7 billion in the high growth scenario (see Table 9). To put these numbers into perspective – the pre-COVID-19 GDP outcome for 2019 was \$1,994 billion.<sup>5</sup>

Production is proportionately larger under the high growth scenario. This reflects the fact that much of the investment is targeted towards exploration and developing new basins, which have capacity for a higher yield. As a result of this higher potential production, the returns on investment are larger for the high growth scenario (see Figure 18).

The investment hits are particularly dominant under both growth paths. This means the impact on GDP peaks between 2024 and 2028. These impacts then lessen over subsequent years, but continue to grow, as production for the forecast projects accelerates and gas prices decrease throughout the economy. For the low growth scenario, the impact on national economic output is most dominant in 2025 at \$25 billion. Comparatively, for the high growth scenario, the GDP impact is at its highest in 2026, with an additional \$58 billion of economic activity generated.

Figure 18: GDP impacts for the low and high growth scenarios, 2021-2040 (\$ millions)



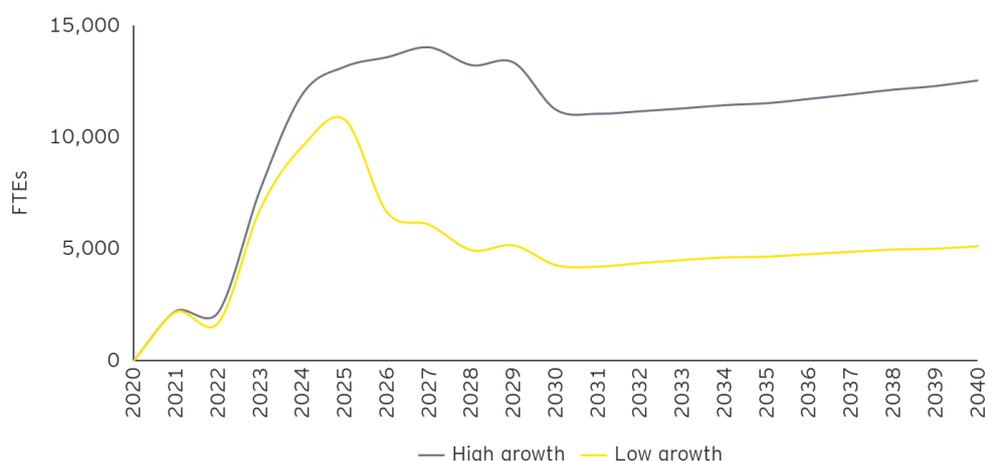
Source: EY analysis.

The capital-intensive nature of gas production means that the employment impacts, whilst large, are not as large as the size of the GDP impacts. In the low growth scenario, about 105,000 additional full time equivalent (FTE) jobs may be created over the twenty years, compared with the baseline (see Table 9). This rises to 220,000 jobs under the high growth scenario.

Over the twenty-year period, the change in employment follows a similar trajectory to economic output (see Figure 19). The impact on employment for the low growth path is particularly pronounced in 2025, which coincides with the peak in GDP under this scenario. While these effects do not reach the same levels in subsequent years, Figure 19 highlights the growing employment generation over time, as the rest of the economy benefits from lower gas costs. For the high growth frontier, the employment effects are particularly strong for several years between 2024 and 2029, before a more gradual tapering off as the initial investment hit subsidies. Like the low growth scenario, job creation increases between 2030 and 2040, reflecting the increased productivity in the rest of the economy.

<sup>5</sup> ABS Cat. no. 5206.0

Figure 19: Employment impacts for the low and high growth scenarios, 2021-2040 (FTE)



Source: EY analysis.

While the estimated impacts for gross national income (GNI), are lower than GDP, they are still significant (see Table 9). GNI measures a country's total income and includes income derived from foreign investments. This difference reflects the strong investment made by our foreign trade and investment partners in the Australian oil and gas industry.

Table 9: Estimated economic impacts

Variable	NPV 2021-40	2025	2030	2040
<b>Low growth scenario</b>				
Gross Domestic Product (GDP), \$billion^	176.4	24.6	19.1	20.0
Gross National Income (GNI), \$billion^	136.5	26.7	11.7	12.2
Tax revenue, \$billion^	71.0	12.4	7.0	8.3
Employment, FTE*	105,000	11,000	4,000	5,000
<b>High growth scenario</b>				
Gross Domestic Product (GDP), \$billion^	352.7	27.4	41.8	47.9
Gross National Income (GNI), \$billion^	241.9	30.1	27.6	28.1
Tax revenue, \$billion^	137.2	13.3	16.8	20.2
Employment, FTE*	220,000	13,000	11,000	13,000

^ Estimates are reported as Net Present Value (NPV) and adopt a discount rate of 7%. \*Employment is reported as a cumulative total and is not discounted.

Source: EY analysis.

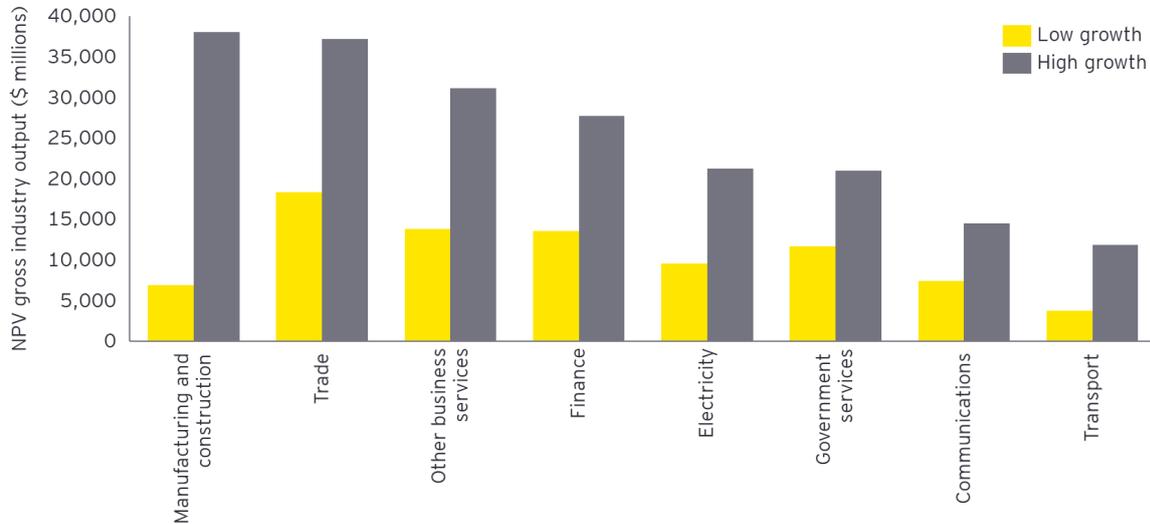
### Flow-on effects

As well as increasing national output and creating jobs, under the two growth frontiers, there are important spill over effects that are expected to arise to other industries in the economy. The oil and gas industry has intermediate demand and supply linkages to a range of sectors in the economy. Growth in the oil and gas sector has flow-on impacts to wages and profits in these sectors. As highlighted in Figure 20, industries such as finance, business services, trade and communications all benefit under the two scenarios.

The effects are particularly pronounced under the high growth scenario. This is largely due to the increase in investment, export production and job creation, which in turn, boosts aggregate demand in the economy. Indeed, these effects, under the high growth scenario, highlight that unlocking new energy resources at scale builds wealth and economic resilience for the entire country.

In particular, Australia’s manufacturing and construction businesses stand to benefit under the two growth paths. Activity in these sectors could increase by about \$38 billion under the high growth scenario and \$7 billion under the low growth path. The ability for expanded gas production to drive down gas and electricity prices offers significant scope for growth in this sector. Increasing the affordability and security of energy could help Australia maintain an internationally competitive industrial manufacturing sector and is likely to be a particularly attractive proposition for energy-intensive firms.

Figure 20: Gross industry output, NPV (2020-2040)

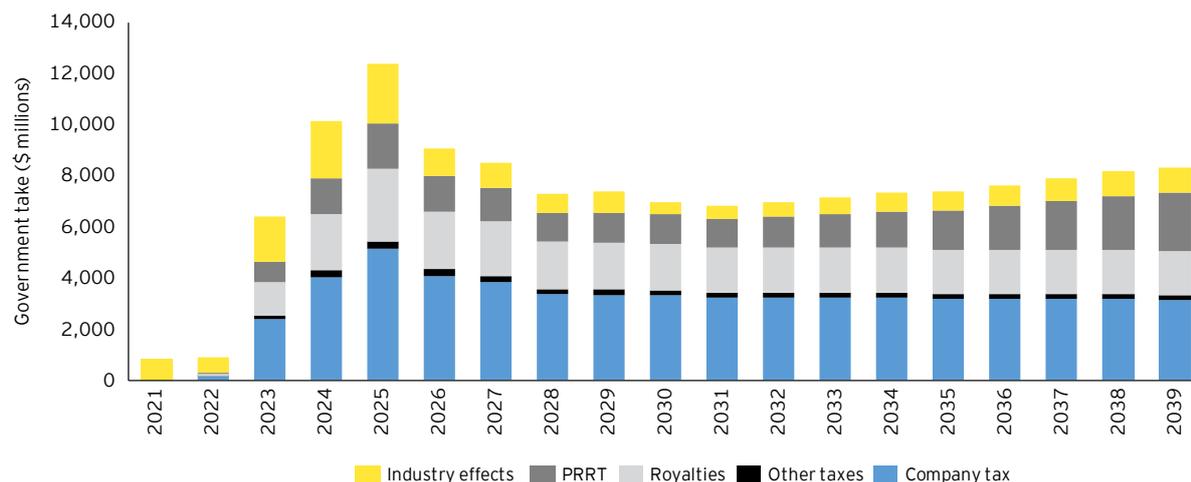


Source: EY analysis.

Another component of the sector’s contribution is the additional tax revenue generated under the two growth paths. The estimated tax take for the government is significant, totalling \$137 billion between 2021 and 2039 for the low growth scenario and \$286 billion for the high growth scenario (see Figure 21 and Figure 22). Government tax collection under the high growth scenario is about 208% higher than under the low growth path, reflecting the significant upside of positive tax and regulatory reform.

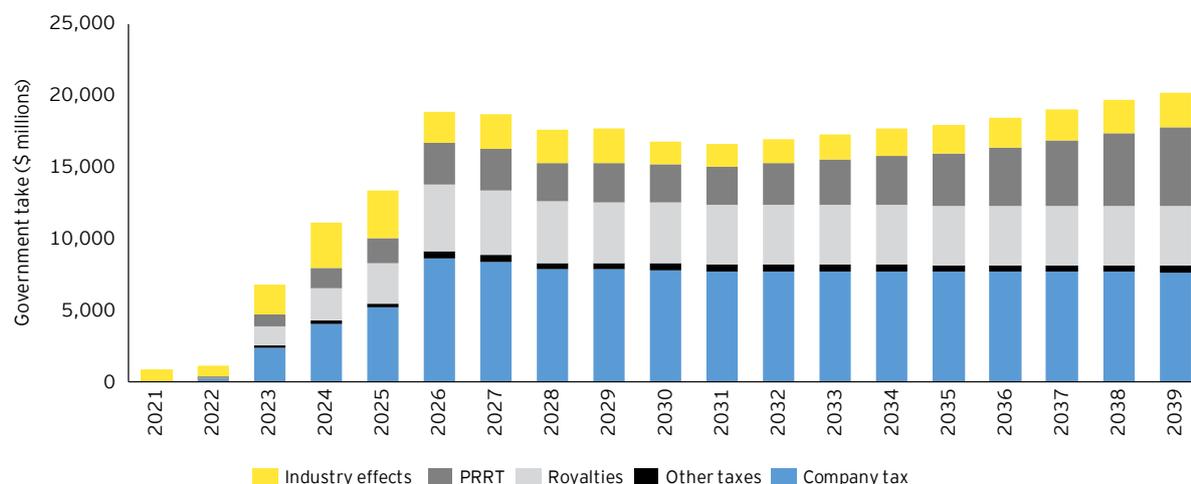
Of this tax take, most is estimated to comprise direct taxes paid by the sector. These include company tax, royalties, PRRT and other taxes paid by the sector (see Table 2 for more detail). For the low growth scenario, the estimated direct taxes paid by the sector totals \$119 billion and for the high growth scenario this increases to \$247 billion. Figure 21 and Figure 22 also showcase the increase in taxes paid by other industries. This is due to the sectoral linkages previously discussed. Between 2021 and 2039, tax revenue generated due to extra industry activity is estimated to be about \$19 billion under the low growth scenario and \$39 billion under the high growth scenario.

Figure 21: Tax revenue impacts for the low growth scenarios, 2021-2039 (\$ millions)



Source: EY analysis.

Figure 22: Tax revenue impacts for the high growth scenarios, 2021-2039 (\$ millions)



Source: EY analysis.

### 6.3 The economic cost of regulation

Oil and gas developments are often subject to high levels of public scrutiny, especially in regard to environmental and planning laws. In many cases, planning and approval processes increase delays, as well as adding to the risks associated with a project. The Productivity Commission indicated that a one-year delay to a major offshore LNG project could cost anywhere from \$500 million to \$2 billion.

While regulation plays an important role in establishing a project, there is room for some regulation to be improved or streamlined. Inefficient, or suboptimal, regulation bears a significant cost, particularly given the highly competitive global market for capital. Like a tax, regulation also has flow on effects to labour supply, investment and savings.

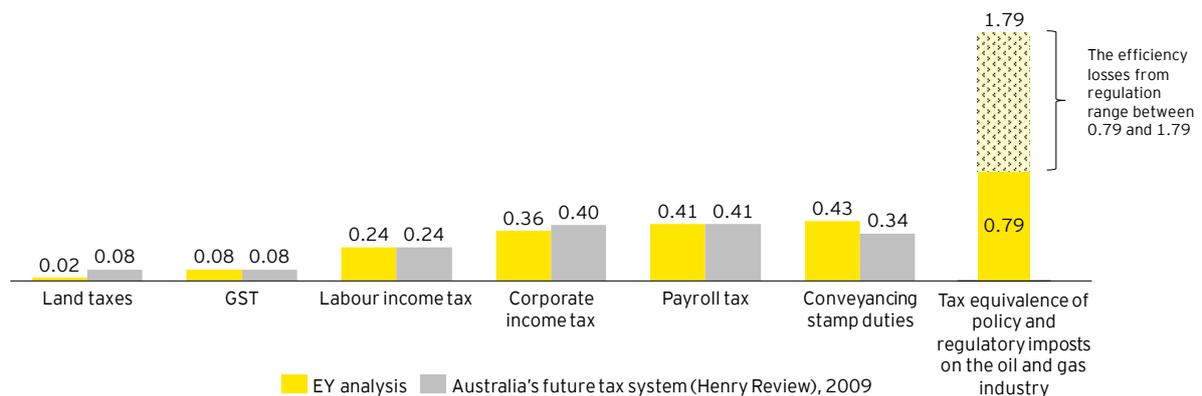
It is therefore possible to consider the tax 'equivalence' of regulation on industry growth paths. As noted above in Chapter 6.1, the difference between the high and low industry profiles modelled represents the possible realisations under two sets of industry conditions. The high growth trajectory highlights the possible economic output under an investment inducive policy environment, while the low growth scenario is reflective of the likely outcomes under current conditions.

A proxy tax which would reduce the oil and gas industry from a high to low growth trajectory over the next 20 years would be highly inefficient, with a marginal excess burden (the economic efficiency losses from raising a tax) of 0.79, which far exceeds the costs imposed by existing taxes, such as payroll tax (see Figure 23). The analysis shows that regulations which lower the industry from its current investment and production frontier are very costly in economic terms.

A key aspect of these economic costs is that because, unlike taxes, regulation does not generate revenue for the government, which funds programs and circulates throughout the economy. Rather, regulation typically has few multiplying impacts. In fact, every billion dollars of industry activity lost through regulation could generate an overall economic efficiency loss of up to \$1.79 billion. These costs should be recognised alongside the potential social and environmental risks of projects which many regulations seek to manage or avoid.

This reflects the significant cost of regulations that unduly hinder investment in the oil and gas industry. While policymakers are often concerned about inefficient taxes, the evidence suggests that at least as much scrutiny should be applied when considering the scale and scope of regulation applying to the industry, as discussed in Chapter 5.

Figure 23: Marginal excess burden rankings



Source: EY analysis, technical analysis undertaken for the Henry Review (Australia's Future Tax System Review).

## 7. Conclusions

The COVID-19 pandemic has inflicted unprecedented damage on the global economy. Like the rest of the world, Australia has been badly impacted from the COVID-19 crisis, with a 7% decline in economic output between the March and June quarters. This has pushed Australia into its first recession in almost 30 years.

Throughout the crisis, the oil and gas industry has been one of Australia's strongest performers, providing critical support to the economy. As Australia begins the slow economic recovery process, the oil and gas industry will have an important role to play – in both the immediate term and over the long run.

As demonstrated by the analysis in this report, renewed investment in the oil and gas industry can support Australia's recovery from the crisis, helping realise the massive economic potential from Australia's world-class oil and gas reserves. However, market conditions remain highly challenging, and current regulatory settings can play a stronger role in unleashing this potential and stimulating industry investment.

Given the present slump in global LNG prices, market uncertainty and aggressive global competition for capital, it is imperative that Australia has a competitive and agile business environment. Indeed, pro-growth tax and regulatory settings have significant economic upside through their capacity to boost competitiveness and facilitate a new wave of investment in oil and gas projects, which improve the prospects for all Australians.

## Appendix A EY's whole of economy model

EYGEM is a multi-commodity, multi-region, dynamic model of the world economy. Like all economic models, EYGEM is based on a range of assumptions, parameters and data that constitute an approximation to the working structure of an economy. Its construction has drawn on the key features of other economic models such as the global economic framework underpinning models such as GTAP and GTEM, with state and regional modelling frameworks such as Monash-MMRF and TERM.

Labour, capital, land and a natural resource comprise the four factors of production. On a year-by-year basis, capital and labour are mobile between sectors, while land is mobile across agriculture. The natural resource is specific to mining and is not mobile. A representative household in each region owns all factors of production. This representative household receives all factor payments, tax revenue and interregional transfers. The household also determines the allocation of income between household consumption, government consumption and savings.

Capital in each region of the model accumulates by investment less depreciation in each period. Capital is mobile internationally in EYGEM where global investment equals global savings. Global savings are made available to invest across regions. Rates of return can differ to reflect region specific differences in risk premiums.

The model assumes labour markets operate in a model where employment and wages adjust in each year so that, for example, in the case of an increase in the demand for labour, the real wage rate increases in proportion to the increase in employment from its base case forecast level.

EYGEM determines regional supplies and demands of commodities through optimising behaviour of agents in perfectly competitive markets using constant returns to scale technologies. Under these assumptions, prices are set to cover costs and firms earn zero pure profits, with all returns paid to primary factors. This implies that changes in output prices are determined by changes in input prices of materials and primary factors.

## Appendix B Australia's LNG projects

Table 10: Australia's key LNG development projects

Project	Investors	Location Basin Plant	Final Investment Decision (FID) and First Gas (FG)	Size	Cost
North West Shelf	Woodside Shell BP Developments Chevron BHP Billiton MIMI CNOOC	WA Carnarvon Karratha	FG 1989 (pipeline gas in 1984)	16.9 Mtpa 5 trains	A\$34b
Darwin LNG	ConocoPhillips ENI Australia Santos INPEX JERA Tokyo Gas	NT JPDA Darwin	FG 2006	3.7 Mtpa 1 train	Not available
Pluto LNG	Woodside Tokyo Gas Kansai Electric	WA Carnarvon Karratha	FID 2007 FG 2012	4.9 Mtpa 1 train	A\$14.9b
Queensland Curtis LNG	Shell CNOOC Tokyo Gas	QLD Surat Gladstone	FID Oct 2010 FG Jan 2015	8.5 Mtpa 2 trains	A\$20.4b
Gladstone LNG	Santos Petronas KOGAS	QLD Bowen and Surat Gladstone	FID Jan 2011 FG Oct 2015	7.8 Mtpa 2 trains	A\$18.5b
Australia-Pacific LNG	Origin Energy ConocoPhillips Sinopec	QLD Bowen and Surat Gladstone	FID T1 Jul 2011 T2 Jul 2012 FG Jan 2016	9 Mtpa 2 trains	A\$24.7b
Gorgon LNG	Chevron ExxonMobil Shell Osaka Gas Tokyo Gas JERA	WA Carnarvon Barrow Island	FID 2009 FG Mar 2016	LNG - 15.6 Mtpa 3 trains	US\$60b
Wheatstone LNG	Chevron Woodside KUFPEC Kyushu Electric	WA Carnarvon Onslow	FID Sept 2011 FG Oct -2017	LNG - 8.9 Mtpa 2 trains	US\$34b
Ichthys LNG	INPEX CPC Corporation Taiwan Tokyo Gas Osaka Gas Kansai Electric Power Chubu Electric Toho Gas	WA Browse Darwin	FID Jan 2012 FG Nov 2018	8.9 Mtpa 2 trains	Over US\$45b

Project	Investors	Location Basin Plant	Final Investment Decision (FID) and First Gas (FG)	Size	Cost
Prelude Floating LNG	Shell INPEX KOGAS OPIC (CPC Taiwan)	WA Browse	FID May 2011 FG June 2019	3.6 Mtpa 1 train	US\$12.6b

Source: Various.

## Appendix C Transmittal letter and scope



Ernst & Young  
121 Marcus Clarke Street  
Canberra ACT 2600 Australia  
GPO Box 281 Canberra ACT 2601

Tel: +61 2 6267 3888  
Fax: +61 2 6246 1500  
ey.com/au

Andrew McConville  
Chief Executive Officer  
Australian Petroleum Production & Exploration Association (APPEA)  
Level 10, 60 Marcus Clarke Street  
CANBERRA ACT 2601

20 November 2020

### **The role of Australia's oil and gas sector in the recovery from COVID-19**

Dear Andrew

In accordance with our Engagement Agreement dated 25 May 2020 ("Agreement"), Ernst & Young ("we" or "EY") has been engaged by the Australian Petroleum Production & Exploration Association ("you", "APPEA" or the "Client") to assess the role of Australia's oil and gas sector, and the impact of taxation and regulatory reform, in the recovery phase of the COVID-19 pandemic (the "Services").

The enclosed report (the "Report") sets out the outcomes of our work. You should read the Report in its entirety. A reference to the report includes any part of the Report.

#### **Purpose of our Report and restrictions on its use**

We understand that the deliverable by EY will be used for the purpose of providing economic analysis, on a non-reliance basis, to support APPEA develop its position through research, analysis and modelling in order to frame the case for reform which supports Australia's oil and gas sector and the economy more broadly (the "Purpose").

This Report was prepared on the specific instructions of APPEA solely for the Purpose and should not be used or relied upon for any other purpose.

This Report and its contents may not be quoted, referred to or shown to any other parties except as provided in the Agreement. We accept no responsibility or liability to any person other than to APPEA or to such party to whom we have agreed in writing to accept a duty of care in respect of this Report, and accordingly if such other persons choose to rely upon any of the contents of this Report they do so at their own risk.

#### **Nature and scope of our work**

The scope of our work, including the basis and limitations, are detailed in our Agreement and in this Report.

Our work commenced on 25 May 2020 and was completed on 20 November 2020. Therefore, our Report does not take account of events or circumstances arising after 20 November 2020 and we have no responsibility to update the Report for such events or circumstances.

In preparing this Report we have considered and relied upon information from a range of sources believed to be reliable and accurate. We have not been informed of any information supplied to us, or obtained from public sources, was false or that any material information has been withheld from us.

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We do not imply and it should not be construed that we have verified any of the information provided to us, or that our enquiries could have identified any matter that a more extensive examination might disclose. However, we have evaluated the information provided to us by APPEA as well as other parties through enquiry, analysis and review and nothing has come to our attention to indicate the information provided was materially mis-stated or would not afford reasonable grounds upon which to base our Report.

The work performed as part of our scope considers information provided to us and a combination of input assumptions relating to future conditions, which may not necessarily represent actual or most likely future conditions. Additionally, modelling work performed as part of our scope inherently requires assumptions about future behaviours and market interactions, which may result in forecasts that deviate from future conditions. There will usually be differences between estimated and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. We take no responsibility that the projected outcomes will be achieved.

We highlight that our analysis and Report do not constitute investment advice or a recommendation to you on a future course of action.

Our conclusions are based, in part, on the assumptions stated and on information provided by APPEA and other information sources used during the course of the engagement. The modelled outcomes are contingent on the collection of assumptions as agreed with APPEA and no consideration of other market events, announcements or other changing circumstances are reflected in this Report. Neither Ernst & Young nor any member or employee thereof undertakes responsibility in any way whatsoever to any person in respect of errors in this Report arising from incorrect information provided by APPEA or other information sources used.

Thank you for the opportunity to work on this project for you. Should you wish to discuss any aspect of this Report, please do not hesitate to contact me on 02 6279 4540.

Yours sincerely

A handwritten signature in black ink, appearing to read 'S. Brown', with a stylized flourish at the end.

Steve Brown  
Partner

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