



Economics and Industry Standing Committee

The economic impact of floating LNG on Western Australia

Volume 1

Report No. 2
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Legislative Assembly
Parliament of Western Australia

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Report No. 2

Presented by

Mr I.C. Blayney, MLA

Laid on the Table of the Legislative Assembly on 15 May 2014

Chairman's Foreword

I am pleased to present the first of the Economic and Industry Standing Committee's (the Committee's) reports from its Inquiry into the economic impact of floating liquefied natural gas (FLNG) on Western Australia.

Natural gas is incredibly important to Western Australia (WA) and to Australia. Approximately 60 per cent of WA's electricity generation is fuelled by natural gas. Not only does it power households and industry, since 1989 natural gas produced in WA has been at the heart of Australia's LNG export industry. Currently, Australia produces 24 million tonnes per annum of LNG for export, and is well placed to become the world's largest producer of LNG by 2020.

WA has played an important role in developing Australia's current position and will continue to have a strong role. Two of the three existing LNG plants are situated in WA, namely the North West Shelf and Pluto plants, with a further two major LNG export facilities currently under construction in the state—the Gorgon plant on Barrow Island and the Wheatstone plant near Onslow.

Historically, then, Australia's offshore petroleum resources have been processed onshore. Recently, though, Shell has commenced construction of its Prelude FLNG unit, which will extract and process offshore the resources in the Prelude field. Woodside, too, has announced that FLNG is its preferred development concept at this time for the development of its Browse Retention Leases.

The aim of this Inquiry was to explore the impact of the use of FLNG technology on the engineering and design, manufacturing and fabrication, and construction and ancillary services sectors of the WA economy. The Inquiry also investigated the impact of FLNG on the supply of domestic gas for WA and the impact on state government revenue.

This Inquiry has shown that the development of FLNG technology to process Australian petroleum resources represents a particular challenge to WA, due largely to the limited opportunities available to local content providers, for a variety of reasons. FLNG will also generate less income for Western Australia than processing the same fields using onshore processing, which is something that should be of serious concern to the state government.

There is significant current demand for domestic gas in WA. There is also a significant appetite in some areas of WA industry to use natural gas as a substitute for diesel. It is clear that a sufficient and reliable supply of domestic gas is essential for the continued economic development of the state. Along with my fellow Committee members, I fully support the retention of the state gas reservation policy, particularly as FLNG technology will not provide any gas into the domestic market. It is therefore essential

that the Western Australian Government reviews its policies to reflect the existence of FLNG technology and continues to play an active role in energy regulation in WA.

One way to meet some of the challenges presented by FLNG development is to look for opportunities that might be generated by the use of an innovative technology. The main opportunities at present seem to be in subsea engineering and the operational phase of FLNG developments, and the continued development of WA's world class workforce development and training sector.

Like all offshore oil and gas operations, FLNG developments will need logistical support throughout their installation and operational phases. There is the potential for significant local content to be involved in providing these ancillary services to FLNG developments off the WA coast. James Price Point represents an excellent opportunity for a regional supply base that would also operate as an emergency response facility, helicopter support facilities, fabrication and maintenance support and, ultimately, a valuable defence site.

It is essential that Western Australian industry is able to take advantage of as many FLNG-generated opportunities as possible. Project proponents have signalled an intention to use local content, and it is vital that project proponents, governments and local content providers work together to ensure maximum local content on all oil and gas projects. Given the importance of local content, the Committee will be undertaking further work on the opportunities that could come from FLNG for WA and will table a separate report on this issue.

Generally speaking, petroleum resources are located in the Commonwealth offshore area with only a very small percentage of offshore petroleum resources falling under WA's exclusive jurisdiction. This means that the vast majority of Australia's offshore petroleum resources are governed by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (the OPGGS Act), with Joint Authorities established to make decisions about Exploration Permits, Retention Leases and Production Licences for particular jurisdictions.

Retention Leases have operated as a review mechanism for offshore petroleum reserves, with lease provisions, such as those relating to commercial viability, limiting—though not eliminating—the potential for project proponents to warehouse reserves. The implementation of FLNG technology should further ensure that petroleum reserves cannot be locked away for decades solely on commercial viability grounds.

Until recently, the Commonwealth–Western Australia Offshore Petroleum Joint Authority took a consultative approach to decision-making. For example, until 2013, all conditions on the seven Browse Retention Leases were the same, despite five of these leases being for Commonwealth area reserves and two for state areas. However, in

December 2013, the then Commonwealth Minister made a unilateral decision to approve the removal of the condition on the lease that required onshore processing at James Price Point. That Commonwealth decision fundamentally affects WA by opening the way for FLNG development of the Browse fields, which may not be in the state's best interest.

The primarily Commonwealth public administration of offshore petroleum reserves added an additional layer of complexity to this already complex Inquiry. Not only are Commonwealth decisions not necessarily best for the state, as a Committee of the Western Australian Parliament we are limited in the recommendations that can be made to remedy particular problems generated at a federal level. This has resulted in a significant number of the recommendations in the report being directed to the state government urging it to negotiate with the Commonwealth as a matter of priority to address areas of concern. As Chairman of the Committee, I wish to emphasise this point. Given the importance of natural gas to the state, its households and industry, it is essential that the Western Australian Government take urgent action in relation to the findings and recommendations made in the report.

The Committee invited NOPSEMA, as the National Authority, to attend a hearing for this Inquiry. Unfortunately, NOPSEMA declined to appear before the Committee. Regrettably, as yet, the Committee has also been unable to meet with the Commonwealth Minister for Industry, Hon Ian Macfarlane MP.

This Inquiry would not have been possible without the contributions of my fellow Committee members, namely Hon Fran Logan, MLA, the Deputy Chairman, Mr Jan Norberger, MLA, Mr Peter Tinley AO, MLA, Mr Vince Catania, MLA, who left the Committee in August 2013, and Mr Shane Love, MLA, who joined us at that time. I would like to thank the Committee staff, Dr Loraine Abernethie and Mr Michael Burton, for their assistance. The Committee was also able to engage Mr Bill Tinapple as a technical consultant to provide specialist advice throughout this Inquiry. I thank Bill for his invaluable support.



MR I.C. BLAYNEY, MLA
CHAIRMAN

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Executive Summary

The production of natural gas from offshore reserves is particularly important to the economy of Western Australia. There is no doubt that the continued prosperity of the state is tied to the development and use of its large reserves of natural gas.

At its simplest, oil and gas production in Western Australia (WA) consists of extracting hydrocarbons (mostly natural gas and condensate) from offshore gas fields, and using offshore production platforms to separate the wellstream components and transport the crude oil, condensate, liquefied petroleum gasses (LPGs) and natural gas to an onshore processing facility for further processing. The refined natural gas that is produced can then either be supplied to WA's domestic market via pipeline, or else liquefied for export.

The vast majority of Australia's petroleum reserves are located off the WA coast. The North West Shelf project, which was developed by Woodside and its Joint Venture partners in the 1980s, along with the subsequent discovery and development of other fields by companies such as Shell, Chevron, BHP, BP, Apache, ExxonMobil and INPEX, have brought enormous benefits to WA. These benefits have included significant export revenue, direct and indirect employment, the development of local engineering, manufacturing, fabrication and supply industries and a reliable supply of natural gas for the domestic WA market, which has, in turn, aided industrial development. The development of the state's oil and gas reserves also resulted in significant state government revenue, particularly in the form of royalties and payroll taxes.

Until now, natural gas and LPGs have been processed onshore. However, in May 2011 Shell decided to proceed with its Prelude floating LNG (FLNG) project to develop the Prelude and Concerto gas fields in the Browse Basin, some 475 km north of Broome. In September 2013, Woodside announced that it would not develop its Browse gas fields using onshore processing at James Price Point, and would work on a development concept using Shell's FLNG technology. Other oil and gas companies have also signalled an intention to develop gas reserves in waters off the WA coastline using Shell's or other FLNG technology.

This report is concerned with the impact of FLNG technology on the WA economy. In particular, it is concerned with the impact of FLNG on the engineering and design, the fabrication and engineering, and the construction and ancillary services sectors of the economy. It also investigates the effect of FLNG developments on the supply of domestic gas for WA and on State revenue.

Given the complexity of oil and gas projects and the similarly complex international market in which these products are traded, **the Committee considered it important to provide sufficient background information as context for its discussion of the evidence presented to this Inquiry.** To this end, as well as the background information provided in individual chapters, the report contains detailed information on the significance of oil and gas resources to WA, known conventional and unconventional natural gas reserves, current Australian LNG projects, the history of the development of WA's oil and gas industry, and the international LNG market. This information is contained in Chapter 1, and Chapters 11 and 12 (Volume 2).

When speaking in support of developing petroleum resources using FLNG technology, oil and gas companies commonly referred to the term 'stranded gas.' Chapter 1 provides a closer examination of this term and the argument presented that FLNG technology allows the development of otherwise non-commercially viable reserves. This also raises the issue of the assessment of Retention Leases in accordance with the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) and whether the renewal of such leases is always in WA's best interest.

Australian mineral resources are the property of the Crown, which effectively holds those resources on trust for the citizens of the state in which they are located. When a state's resources, including oil and gas, are extracted and sold by mining companies, mining royalties and taxes are paid to the State as compensation to its citizens for the loss of the resource. This means that Western Australians are significant stakeholders in the state's natural resources. With conventional oil and gas, however, the vast majority of Australia's resources are located in Commonwealth waters, which means that the Commonwealth has exclusive jurisdiction over these resources. **The issue of property rights** is further explored in Chapter 1.

Chapter 1 also outlines the importance of the Inquiry and the method used to gather the evidence presented in this report.

In Chapter 1, the Committee acknowledges that the Inquiry is into the impact of FLNG technology on WA, rather than project proponents' decisions to use this technology. Nevertheless, to fully consider the Inquiry terms of reference **it was necessary to discuss with companies their reasons for considering FLNG as a development option in preference to onshore facilities.** The main issues raised were the relatively high cost of Australian labour, the apparent lower productivity of the Australian resources industry, the regulatory burden imposed by governments, sovereign risk, increasing global competition in the gas market and the need to achieve acceptable rates of returns for investors. These matters are discussed in detail in Chapter 13 (Volume 2).

Chapter 2 provides information on the public administration of Australian offshore oil and gas activities. This includes a history of the regulation of offshore oil and gas

activities, and outlines the current regulatory framework, including an outline of the administration of petroleum Exploration Permits, Production Licences and Retention Leases. As most petroleum resources are located outside WA's coastal water boundary, only a very small proportion is exclusively in WA's jurisdiction. This means that most of Australia's petroleum resources are governed by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth). Importantly, **this legislation provides for the establishment of a Joint Authority for each jurisdiction to make major decisions concerning petroleum titles**, title conditions and resource management and security.

In June 2013, Woodside applied to the National Offshore Petroleum Titles Administrator to vary its Browse Retention Leases to remove the condition to process Browse Basin gas at James Price Point. On 2 August 2013, then federal Minister, Hon Gary Gray MP, **unilaterally decided to approve the variation to the Retention Leases**, thus opening the way for Woodside to announce FLNG as its preferred development option. This unprecedented decision, which was made without fair and reasonable consideration of WA's position, is also discussed in Chapter 2.

An important contributor to the benefits accrued by WA from the development of its natural resources is the amount of work provided by project proponents to local suppliers. **Australia and WA have local content initiatives designed to improve the involvement of local/domestic business and industry in the exploitation of the country's natural resources.** Chapter 3 outlines the federal and state government initiatives mentioned in evidence to the Inquiry. This chapter also comments on the effectiveness of the state initiatives and provides data on the local content of major WA oil and gas projects. The question of whether government local content initiatives are relevant or appropriate to maximise FLNG project opportunities for local content providers is also raised. Finally, Chapter 3 outlines approaches to local content taken by other countries.

The impact of FLNG on the engineering and design, fabrication and manufacturing, and construction and ancillary services sectors are investigated in Chapters 4, 5 and 6 respectively. Chapter 4 begins with some introductory comments that apply equally to Chapters 5 and 6. Consideration is given to the difficulty in comparing projects, differences of opinion between proponents and critics of FLNG as to whether the technology will result in a net benefit to the state, and the inability of the Committee to specifically quantify the impact of FLNG on the various sectors of the economy.

The main focus of Chapter 4 is the impact of FLNG on WA's design and engineering sectors. There has been a general decline in the level of design engineering capacity and skill in Australia since the design and procurement contract for train 5 of the North West Shelf project was awarded overseas in 2005. There has also been a global trend toward using the engineering procurement and construction management (EPCM) model to oversee the execution of resource projects. The impact of these

developments makes it clear that without the involvement of local engineers in the design phase of projects, subsequent work opportunities for local engineers will be limited. Furthermore, local engineering design is the key to accessing project supply chains. Offshore design engineering has a negative flow-on effect on local manufacturing and fabrication businesses. This chapter concludes with a discussion on the potential opportunities in subsea and explorations engineering, and for engineers in the operational phases of FLNG projects.

While LNG projects continue to provide work for local metal fabricators and manufacturers, participation by these sectors in WA oil and gas projects has declined following the move to modular fabrication. WA metal fabricators have faced considerable challenges in trying to compete in what is now a global marketplace. These challenges, which are discussed in Chapter 5, will be exacerbated where FLNG technology is used to develop Australian oil and gas resources. Evidence gathered in the course of this Inquiry strongly suggests that Australian metal fabricators will have no opportunity to contribute to the production of FLNG vessels. Equally, however, there is evidence to suggest that some opportunities for the metal fabrication industry will arise in the supply of the complex subsea componentry for Australian and international FLNG projects. The Committee believes that WA metal fabricators have the necessary capabilities to produce high quality work required for subsea componentry. Though FLNG technology means WA metal fabricators will need to find niche areas of manufacture to allow them to supply domestic and international markets, this technology also presents them with an opportunity to demonstrate their skills.

The significant negative impact that the use of FLNG technology in Australian waters will have on the WA sector is discussed in Chapter 6. **Until now, the need for onshore processing and liquefaction plants to produce LNG from Australian natural gas resources has provided tens of thousands of construction jobs.** While the construction of an onshore plant at James Price Point, for example, would have created thousands of construction jobs, developing the Browse gas fields **using FLNG technology means that these jobs will likely not eventuate.** This also means that the enormous flow-on benefits of construction will not be generated.

Most of the opportunities for local content seem to be in the ancillary or service sectors for the operational phase of FLNG projects. Chapter 6 also outlines project proponents' forecasts in relation to operational personnel requirements for FLNG facilities, and notes Shell's commitment to employing Australians to work on Prelude FLNG. It is also likely that FLNG operations will require the construction of onshore supply bases in WA. While the construction of a supply base is nowhere near the scale of the construction of an onshore gas processing facility, supply base construction will provide some opportunities for WA businesses and workers.

While Chapters 4, 5 and 6 demonstrate the largely negative impact of FLNG technology for WA, the Committee also consistently heard evidence that **WA is well positioned to take first-mover advantage of FLNG technology and become a centre of excellence for FLNG**. Noting the lack of clarity from proponents about what this might mean, Chapter 7 discusses what are considered to be existing centres of excellence in WA. In particular, Chapter 7 discusses the work of the Australian Centre for Energy and Process Training (ACEPT) in developing world-class training facilities for workers in the oil and gas, pharmaceutical, chemical and mining industries. The work undertaken by ACEPT in conjunction with major oil and gas companies represents a significant achievement. Expansion of the ACEPT training facility would allow it to meet not only the increased demand for domestic workforce training for the resources sector generally and for FLNG in particular, but to expand its export potential in terms of providing overseas training.

Chapter 7 also notes that the Committee intends to undertake further work in relation to opportunities arising from the use of FLNG technology.

This Inquiry also considered the impact of FLNG technology on the supply of natural gas for the domestic market. In 2011, a former Economics and Industry Standing Committee tabled a report on domestic gas pricing, paying particular attention to the forecast for domestic gas supply. This Inquiry also received evidence in relation to these matters. This report, though, does not cover them in any great detail, other than to note that the supply of adequate quantities of natural gas into the domestic market is far from certain beyond 2020. One question, though, is common to both Inquiries, namely how best to achieve a balance between domestic use and export of a valuable, strategic resource. This is the subject of Chapter 8. **As the majority of WA's natural gas supply historically has been associated with LNG projects, natural gas projects are an important enabler of industry and industrial development.** This adds weight to the importance of the state government's domestic gas reservation policy. Issues relating to this policy are also discussed in Chapter 8, and the assertion that the reservation policy acts as an impediment to LNG project investment is rejected. Chapter 8 also discusses and dismisses the idea that LNG may be a viable method for supplying domestic gas to WA customers. The existence of the Dampier to Bunbury Pipeline, together with the vast reserves of natural gas off the WA coast, means there is no need to consider LNG as a supply method into the WA market.

In relation to the impact of FLNG technology on WA's domestic gas supply, the Committee notes that FLNG technology is only able to produce LNG, and that considerable infrastructure would be necessary for receiving LNG and converting it back into a gaseous state for consumption. The lack of any such infrastructure in WA, together with the efficiencies of transporting gas by pipeline, means that there will be no domestic gas supplied into the WA market from an FLNG development. FLNG technology can only be used to export natural gas.

The impact of FLNG technology on State revenue has been difficult to determine, largely due to the lack of accurate information and the reliance by government on company-provided data. These and other factors that made it effectively impossible to calculate the impact of FLNG on royalty and payroll tax revenues are discussed in Chapter 9. While general statements are made by proponents about the billions of dollars that FLNG developments would bring to the WA economy, for commercial-in-confidence reasons oil and gas companies were reluctant to make this information publicly available. Chapter 9 provides information on the major sources of government revenue from resource developments, namely the federal government's Petroleum Resource Rent Tax (PRRT), and State royalties and payroll tax. A gas resource developed using FLNG technology would have lower capital costs, but higher operating costs, compared with the onshore development of the same resource. This means that FLNG development is a benefit to the federal government as profits, and thus taxes collected under the PRRT, are generated earlier than would be the case for an onshore project. However, the higher operating costs and portability of FLNG risks leaving considerable resources in the ground.

The state government receives royalty payments from onshore projects and from the North West Shelf project. It will also receive royalties for the gas that is in the state areas of the Torosa field, which is part of Woodside's Browse development. The amount of State revenue from the Torosa field will depend on the unitisation agreement reached between the state and federal governments. At present, there is a lack of agreement between the state government, federal government and Woodside as to how much gas is in the WA area of the Torosa field.

Chapter 9 also discusses the tension between the federal PRRT, as a profits tax, and State royalties as a production based levy. Developing a resource by the quickest method results in early cashflow for the project and, therefore, earlier PRRT revenue for the Commonwealth. PRRT also gives the federal government an incentive to permit the early abandonment of the field under development. By contrast, under a royalty system companies pay for the gas produced, regardless of the cost of doing so. Evidence presented to the Committee suggests that if the Torosa field is developed using FLNG, WA will potentially lose \$1.1 billion as the field may not be fully developed.

As well as discussing PRRT and royalties, Chapter 9 notes the significant contribution payroll tax on wages and salaries in the oil and gas sector makes to State revenue. However, as the chapter also notes, the Committee has not been able to quantify the negative impact FLNG will have on payroll tax. Chapter 9 also outlines the Committee's concerns that government agencies such as the Department of State Development and the Department of Mines and Petroleum appear to be reactive rather than proactive in terms of forecasting and modelling economic outcomes from major projects. This must negatively impact on the effectiveness of state planning to ensure maximisation of the benefits of the state's natural resources.

The Committee received independent modelling of State revenue that would be received as a result of onshore development for a field such as the Torosa gas field. This modelling shows that over a 15 year period, WA would receive up to \$1,735 million in royalties, taxes and GST. This indicates what potentially will not be received with offshore processing of state gas reserves.

General information pertaining to the Inquiry and the evidence provided is contained in a series of appendices located at the end of Volume 2.

Ministerial Response

In accordance with Standing Order 277(1) of the Standing Orders of the Legislative Assembly, the Economics and Industry Standing Committee directs that the Minister for State Development, the Minister for Mines and Petroleum, the Minister for Commerce, the Minister for Energy and the Minister for Training and Workforce Development report to the Assembly as to the action, if any, proposed to be taken by the Government with respect to the recommendations of the Committee.

Findings and Recommendations

Finding 1

Page 10

While the Commonwealth Government has approved the variation to the five Browse Retention Leases in Commonwealth waters, the Western Australian Government has not approved the variation to the two Browse Retention Leases in state waters.

Finding 2

Page 15

‘Stranded gas’ no longer refers to only small and isolated deposits. Proponents of FLNG technology use ‘stranded gas’ to refer to gas that, for a variety of reasons, they do not consider economically viable to develop at a particular period of time.

Finding 3

Page 18

The *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) does not provide for consideration of alternative development proposals in relation to reviewing the renewal of Retention Leases or granting of production licences.

Finding 4

Page 18

Renewing Retention Leases may not be in the best interests of the economic development of Western Australia.

Recommendation 1

Page 18

The Western Australian Government negotiate with the Commonwealth Government to amend the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) to change the assessment of Retention Leases to include providing:

- the Joint Authority with the ability to invite competitive development proposals for the resource being considered; and
- the title holder with the opportunity to match any alternative development proposal or else surrender the title.

Recommendation 2

Page 33

The Minister for Mines and Petroleum and the Minister for State Development urge the Commonwealth Government to specify the criteria for assessing that Retention Leases granted under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) are held for a legitimate need to secure gas for long-lived production projects and not to obtain a competitive commercial advantage.

Finding 5

Page 35

The development of FLNG technology has clear implications for the granting of Retention Leases and renewals, particularly in relation to the requirement that development is not commercially viable at the time of application.

Recommendation 3**Page 35**

The Western Australian Government urge the Commonwealth Government to review the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) to reflect the need for more robust assessment of commercial viability, and as more thorough assessment of applications will be required, appropriate staff resources should be made available.

Finding 6**Page 40**

The Commonwealth Government's 2013 decision to approve variations to the Commonwealth Browse gas field Retention Leases:

- removed from the Commonwealth leases the requirement for the Browse Joint Venture to develop James Price Point; and
- allowed the Browse Joint Venture to consider other development concepts, including FLNG.

Finding 7**Page 41**

The process by which the Commonwealth Government approved the variations to the Commonwealth Browse gas field Retention Leases did not follow established working arrangements.

Finding 8**Page 41**

In solely relying on information, analysis and conclusions provided by project proponents to assess Retention Lease applications, the Commonwealth Government is abrogating its responsibility as a decision-maker on behalf of Australian citizens.

Finding 9**Page 41**

The Commonwealth Government's 2013 unilateral decision to approve variations to the Commonwealth Browse gas field Retention Leases is unprecedented and was made without fair and reasonable consideration of Western Australia's position on the leases and the impact on the development of the Retention Leases for State titles.

Finding 10**Page 41**

The Commonwealth Government's 2013 approval of variations to the Commonwealth Browse gas field Retention Leases does not amend the leases for State titles.

Finding 11**Page 41**

The Western Australian Government is yet to complete its assessment of the applications to vary the Browse gas field leases for State titles.

Recommendation 4**Page 41**

The Minister for State Development takes whatever action is appropriate to ensure the Commonwealth Government complies not only with the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) and the Joint Authority Guidelines, but with the established working arrangements between Joint Authority members. This may include, but not be limited to:

- referring the matter to the Ministerial Council;
- developing changes to the Joint Authority Guidelines so that they better reflect established working arrangements; and/or
- seeking legal advice as to the lawfulness of the Commonwealth Minister's unilateral decision relating to the Browse Retention Leases.

Finding 12**Page 41**

Unilateral Commonwealth decisions relating to petroleum Retention Leases potentially have a major negative impact on the Western Australian economy.

Finding 13**Page 42**

The current Joint Authority provisions in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) put at risk the fundamental basis for which Joint Authorities were established.

Recommendation 5**Page 42**

Given the unilateral decision made on the Commonwealth Browse Retention Leases, and the risk this poses for Western Australia, the Minister for Mines and Petroleum takes the necessary steps to effect the amendment of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) to ensure greater transparency of, and adequate consultation time in, the Joint Authority process.

Finding 14**Page 57**

There is a lack of certainty about the implementation of the *Australian Jobs Act 2013* (Cth) which will add to the perceived risk of doing business in Australia. In particular, the lack of Australian Industry Participation Plan (AIPP) templates and an Australian Industry Participation authority and mandate, together with a lack of clarity about the meaning of full, fair and reasonable opportunity for local companies, render the *Australian Jobs Act 2013* (Cth) obsolete for current and future major projects.

Finding 15**Page 58**

Certainty about the implementation of the *Australian Jobs Act 2013* (Cth) is just as important as the substance of the Act.

Recommendation 6 **Page 58**

The Western Australian Government encourage and work with the Commonwealth Government to provide certainty for project proponents in relation to the *Australian Jobs Act 2013* (Cth) and its implementation.

Finding 16 **Page 64**

It is not clear what criteria the Department of State Development applies in its assessment of whether a resource project should be developed through a State Agreement.

Finding 17 **Page 64**

It is not clear what progress has been made on the implementation of the Auditor General's 2004 recommendations in relation to developing a structured approach to evaluating State Agreement performance.

Finding 18 **Page 64**

It is not clear whether State Agreements are the most effective or efficient means of achieving government policy objectives.

Finding 19 **Page 65**

Despite improvements in the implementation and monitoring of State Agreement local content provisions, the reported data only provides information about major project tenders and contracts after the decisions have been made.

Recommendation 7 **Page 65**

The Department of State Development advises Parliament of its approach to evaluating State Agreement performance and its efforts to improve reporting on State Agreement performance and status.

Recommendation 8 **Page 65**

The Department of State Development undertake an assessment of the effectiveness of State Agreements in achieving the government's stated aims and objectives, and report the results to Parliament.

Recommendation 9 **Page 65**

State Agreement local content reporting requirements include project proponents providing further relevant detail about decisions impacting local content, with this information being made in a transparent manner and subject to greater public scrutiny, including the tabling of information in Parliament.

Finding 20**Page 66**

Aboriginal communities in the Kimberley have diminished economic opportunity as a result of the adoption of FLNG instead of onshore processing at James Price Point.

Recommendation 10**Page 67**

The Western Australian Government work with all project proponents, including Woodside, to ensure that Aboriginal communities benefit from resource developments in the state.

Finding 21**Page 87**

Western Australian local content policies may not provide maximum opportunities for local businesses to participate in FLNG projects.

Recommendation 11**Page 87**

As a matter of priority, the Minister for Commerce review and amend Western Australia's local content policies to ensure their relevance to FLNG developments in coastal waters.

Finding 22**Page 87**

Despite government implementation and monitoring of local content provisions in State Agreements, local businesses still do not have full, fair and reasonable opportunity to participate in these major projects.

Recommendation 12**Page 87**

The Western Australian Government clarify and detail the reporting requirements for State Agreements, and ensure that reporting is through a transparent process to Parliament.

Recommendation 13**Page 87**

The Western Australian Government ensure that through its Lead Agency Framework one agency, from a project's earliest concept development through to its implementation, works to maximise the opportunities for the state. This would include coordination with the Commonwealth Government.

Finding 23**Page 107**

The use of global engineering, procurement and construction management (EPCM) contracting for LNG production projects has had a significant and deleterious effect upon the Australian and, in particular the Western Australian, engineering sector.

Finding 24**Page 107**

Establishing Perth as a global design centre potentially would have substantial benefits for multiple sectors of the economy.

Recommendation 14	Page 107
The Western Australian Government work with the engineering representative organisations to develop strategies that will broaden, promote and retain the engineering skills base in Western Australia.	
Finding 25	Page 110
First-hand knowledge of suppliers' capacity and capability is an important aspect of design engineering.	
Finding 26	Page 110
Engagement of local manufacturing and fabrication businesses largely depends on local engineering in the design phase.	
Finding 27	Page 111
Several factors conspire to exclude the Australian engineering sector from the FLNG design process. These include:	
<ul style="list-style-type: none"> • the use of global engineering, procurement and construction management (EPCM) contracting and consequent tendering to overseas companies; • the exodus of skilled engineers from Perth following the decision to design and engineer the North West Shelf train 5 overseas; and • the design one, build many concept of FLNG project design and detail engineering being done totally overseas. 	
Finding 28	Page 112
FLNG technology potentially will generate opportunities for subsea engineering and design that would not have eventuated from otherwise stranded gas.	
Finding 29	Page 115
The operations phase of FLNG projects has the potential to generate engineering opportunities in Western Australia, in particular subsea engineering.	
Finding 30	Page 138
While Australian manufacturers can still win fabrication work for onshore LNG plants, FLNG technology places them at a geographic disadvantage relative to the construction location and their disconnection from global supply chains.	
Finding 31	Page 140
Liquefied natural gas (LNG) is simply a method of transporting natural gas over long distances.	

Finding 32 **Page 146**

The complex and sophisticated subsea componentry for Australian and international FLNG projects provides an opportunity for the Australian metal fabrication industry.

Finding 33 **Page 148**

As part of a Centre of Excellence, Western Australia can be a successful fabricator of high quality, high value manufacturing for the oil and gas sector.

Finding 34 **Page 160**

The construction of an onshore gas processing and liquefaction plant at James Price Point would create thousands of construction jobs lasting several years. If the Brecknock, Calliance and Torosa gas fields are developed using FLNG technology, these jobs will not eventuate.

Finding 35 **Page 174**

James Price Point provides an opportunity for a supply base, emergency response facility, helicopter support facilities, and fabrication and maintenance support. Such a facility would increase the offshore operations efficiency of projects in Commonwealth waters and, ultimately, increase revenue flow back to the federal government.

Recommendation 15 **Page 174**

The Western Australian Government establish James Price Point as the site for a regional supply base and approach the Commonwealth Government for infrastructure funding.

Finding 36 **Page 178**

Historically, onshore gas processing plants have been a significant driver of economic growth in Western Australia.

Finding 37 **Page 178**

The use of FLNG technology to develop gas fields in Australian waters will significantly reduce construction opportunities for Western Australian businesses and the related flow-on opportunities.

Finding 38 **Page 181**

There is no commonly agreed definition of what constitutes a centre of excellence.

Finding 39 **Page 184**

The Australia Marine Complex provides capacity and capability to enable the fabrication, construction and load out of modular equipment for the oil, gas and mining sectors. It is also a hub for the subsea sector and associated companies, and the defence industry.

Finding 40**Page 187**

The future of the National Floating Systems Research Centre and the Oil and Gas Industry Innovation Partnership is uncertain due to a lack of clarity in relation to Commonwealth Government funding.

Recommendation 16**Page 187**

The Western Australian Government urge the Commonwealth Government to recommit to the previously promised funding for the National Floating Systems Research Centre and the Oil and Gas Industry Innovation Partnership.

Finding 41**Page 194**

The establishment of Western Australia as a global Centre of Excellence for FLNG will require a greater contribution of Commonwealth research funding to achieve long term strategic development for Australia in the offshore petroleum industry.

Recommendation 17**Page 195**

The Western Australian Government pursue a greater contribution of research funding from the Commonwealth, particularly as PRRT revenue from offshore Western Australia flows to the Commonwealth.

Finding 42**Page 199**

The Western Australian Government has yet to respond to The Association of Professional Engineers, Scientists and Managers, Australia's report titled, *Report to the Western Australian Government on local engineering issues and policy*.

Recommendation 18**Page 199**

As part of his response to this Economics and Industry Standing Committee report, the Minister for State Development include a government response to the report titled, *Report to the Western Australian Government on local engineering issues and policy*.

Finding 43**Page 200**

Representative bodies such as Professionals Australia and Engineers Australia support the registration of engineers.

Recommendation 19**Page 200**

The Western Australian Government work with the relevant engineering representative bodies to investigate the merits of a registration system for engineers—similar to that operating in Queensland—and the amendments to the Australian and Western Australian standards required for such registration to be recognised.

Finding 44**Page 205**

The Australian Centre for Energy and Process Training is well placed to take advantage of the opportunity for workforce training and development for FLNG technology.

Finding 45**Page 205**

Without the necessary government funding, the Australian Centre for Energy and Process Training will not be able to maximise its potential to become a world-recognised centre for FLNG training.

Recommendation 20**Page 205**

As a matter of priority, the state government should approve the Australian Centre for Energy and Process Training's funding application for \$14 million to allow it to proceed to Phase 2 of its development.

Finding 46**Page 211**

In Western Australia 97 per cent of natural gas is consumed by industry and in electricity generation, with direct residential and commercial consumption making up the remaining 3 per cent.

Finding 47**Page 219**

Domestic gas processing capacity is not the same as the amount of domestic gas that is produced for supply to the domestic gas market.

Finding 48**Page 220**

There is significant demand for domestic gas in Western Australia. Without certainty of supply, economic development in the state will be negatively impacted.

Finding 49**Page 221**

Without Commonwealth and Western Australian Government policy to ensure supply of natural gas to the domestic market, the future supply to domestic gas consumers is at risk.

Recommendation 21**Page 221**

Given the emergence of FLNG, the Western Australian Government work with the Commonwealth Government to develop an energy policy that secures domestic gas supply.

Finding 50**Page 222**

The success of the United States' expansion of its shale gas production is attributable to the convergence of a number of factors, including:

- a long term and thorough understanding of the subterranean geography;
- technological development;
- the widespread availability of drilling equipment;
- an existing sophisticated gas pipeline infrastructure; and
- the size of the natural gas market in the US.

Finding 51**Page 225**

The Policy on Securing Domestic Gas Supplies (the Reservation Policy) is an essential policy instrument for ensuring that an appropriate level of gas is supplied into the local market.

Recommendation 22**Page 225**

The Western Australian Government retain its Policy on Securing Domestic Gas Supplies (the Reservation Policy).

Finding 52**Page 227**

There is a need for greater transparency of the Commonwealth Government's Retention Lease renewal process.

Recommendation 23**Page 227**

The Western Australian Government urge the Commonwealth Government to increase the transparency of the Retention Lease renewal process through measures including, but not limited to:

- developing specific criteria for the assessment of future compliance with Retention Lease obligations;
- clarifying the specific meaning of the term 'commercially viable' in section 142 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth);
- acknowledging the commercial viability of the development of gas fields for supply into the domestic market rather than for LNG exports;
- allowing third-party submissions in the process of determining an application to renew a Retention Lease; and
- requiring the Commonwealth to undertake due diligence on the proposal.

Finding 53**Page 231**

The delivery of natural gas into the Western Australian domestic gas market via LNG tankers and regasification terminals would not be cost effective or competitive in comparison with transporting gas by pipeline.

Finding 54 **Page 234**

Where it is used to develop Australian natural gas fields, FLNG is quite clearly an export-only technology.

Finding 55 **Page 237**

A secure supply of domestic gas for industry is essential to the economic development of Western Australia.

Finding 56 **Page 237**

Gas fields in Australian waters developed using FLNG technology will provide no domestic gas.

Finding 57 **Page 238**

Developing Australian gas fields with FLNG technology will restrict the overall supply of gas to Western Australian industry and households.

Finding 58 **Page 238**

A restricted supply of domestic gas will severely impact on economic development and energy demand in Western Australia.

Recommendation 24 **Page 238**

The Western Australian Government urgently review its energy policies to reflect the existence of commercially viable FLNG technology.

Recommendation 25 **Page 238**

The Western Australian Government continue to play an active role in energy regulation in Western Australia.

Finding 59 **Page 245**

The Petroleum Resource Rent Tax was designed and implemented prior to the development of FLNG technology.

Recommendation 26 **Page 245**

The Western Australian Government urge the Commonwealth Government to re-examine the tax treatment of the development costs of FLNG and the valuation of the vessel.

Finding 60 **Page 250**

Western Australia has a direct interest in the Browse gas resources through its ownership of a portion of the Torosa gas field.

Finding 61**Page 250**

There is a lack of agreement between the Department of Mines and Petroleum, the Commonwealth Government and Woodside Energy in relation to the proportion of the Torosa field resources that resides in Western Australian waters.

Finding 62**Page 250**

The Department of Mines and Petroleum is yet to define the Western Australian share of the Torosa gas field with Woodside Energy.

Recommendation 27**Page 250**

The Department of Mines and Petroleum provide their minister with a technically robust assessment of the proportion of the Torosa field resources that reside in Western Australian waters.

Recommendation 28**Page 254**

In the event that a single project proponent develops the seven Browse Retention Leases, the Western Australian Government negotiate a unitisation agreement with the Commonwealth Government.

Finding 63**Page 257**

While FLNG units can accommodate field compression equipment, optimum resource recovery is not guaranteed. The absence of compression equipment on FLNG vessels in fields where condensate is present could significantly diminish Commonwealth and state revenue.

Recommendation 29**Page 257**

The Western Australian Minister for Resources advocate the installation of compression equipment as part of the field development plans during the appraisal by the Joint Authority where appropriate. This would oblige project proponents proposing to utilise FLNG technology, and in particular for Browse resources, to demonstrate in their project proposals and field development plan that the technology will optimise resource recovery.

Finding 64**Page 263**

Western Australian Government agencies were not able to produce cogent sets of information necessary to facilitate effective government decision-making on resource value and return to the State.

Recommendation 30**Page 263**

Western Australian Government agencies amend their model of advice to government to ensure the responsible ministers are fully aware of the economic implications before the State enters into any agreements.

Finding 65**Page 265**

Where FLNG technology is used:

- the potential benefits of construction activity, local taxes and downstream activity are lost; and
- a serious loss of revenue to the State will result.

Recommendation 31**Page 265**

The Western Australian Government, as a matter of priority, undertakes economic modelling of the loss of petroleum industry revenue to the State resulting from the introduction of FLNG, including, but not limited to, payroll taxes.

Finding 66**Page 293 (Volume 2)**

Enhanced cooperation between project proponents, such as sharing gas pipelines, processing trains and other gas field infrastructure, could be a viable alternative to FLNG technology for some reserves.

Recommendation 32**Page 293 (Volume 2)**

The Western Australian and Commonwealth Governments examine, as a matter of priority, the sharing of offshore gas field infrastructure to maximise the efficiency of resource development returns to Australia.

Finding 67**Page 313 (Volume 2)**

Statements that Australia is a high cost, low productivity country are simplistic and do not adequately reflect the following:

- reservoir characteristics and climate related plant efficiency;
- the remote and environmentally sensitive nature of development areas;
- the high cost of project engineering and management;
- the lack of supporting infrastructure;
- labour scarcity created by multiple projects being developed at the same time; and
- the recent relatively high level of the Australian dollar.

Finding 68**Page 329 (Volume 2)**

Considerable industry concern exists in relation to the complexity and apparent inefficiency of Australia's regulatory regime for resource projects.

Recommendation 33**Page 329 (Volume 2)**

The Minister for State Development, as a matter of priority, work with the Commonwealth Government to expedite the reduction in the regulatory burden on resource projects, including the establishment of a single approval body.

Chapter 1

Introduction

... the export of natural gas is controlled by the Commonwealth so that we can ensure that the benefits of this newly found and valuable energy resource are available to Australia... exports of natural gas will not be permitted until the Government is satisfied that Australia's needs are reasonably provided for ... if exports are permitted, the Government will ensure that the conditions under which this is allowed will maximise the benefits to Australia. We will require to be satisfied as to price, as to the route of any pipelines and the location of facilities, and that adequate opportunities are available for Australia and Australians to share in the benefits of the project.

Hon Reginald Swartz, MP, Minister for National Development, 1972¹

A significant resource

1.1

The production of natural gas is particularly important to the economic prosperity of the state of Western Australia (WA). In the 2012 calendar year, WA petroleum production was valued at \$24.43 billion, with \$17.33 billion or about 71 per cent coming directly from the development of natural gas resources.² In a 2011 report on domestic gas prices, the then Chairman of the Economics and Industry Standing Committee, Dr Mike Nahan, MLA, remarked that 'Western Australia's economic future is inexorably tied to the development and use of the state's large reserves of natural gas.'³ This statement remains true today. There is increasing global demand for natural gas as an energy source,⁴ which results in economic benefits, including State revenues. WA is the largest producer and consumer of natural gas in Australia with approximately

1 Hon Reginald Swartz, MP, Minister for National Development, Commonwealth Parliament, House of Representatives, *Parliamentary Debates* (Hansard), 28 September 1972, p 2173.

2 Department of Mines and Petroleum, Western Australia, *Western Australian mineral and petroleum statistics digest 2012*, 2013, p 23. All amounts are quoted in Australian dollars unless otherwise noted.

3 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Western Australia, 24 March 2011, p ix.

4 In the aftermath of the Fukushima Daiichi nuclear disaster, for example, nuclear fuel has almost entirely been replaced by natural gas as a fuel source for electricity generation. As a result natural gas is now the primary fuel source for Japanese electricity generation. See: National Bureau of Asian Research, *Energy mix in Japan—before and after Fukushima*, 2013. Available at: http://www.nbr.org/downloads/pdfs/eta/PES_2013_handout_kihara.pdf. Accessed on 17 October 2013.

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92 per cent of Australia's conventional gas resources located off the north west coast of WA in the Carnarvon, Browse and Bonaparte basins.⁵

1.2 A big part of the Australian natural gas success story is the liquefied natural gas (LNG) sector. Since the first shipment of LNG left the North West Shelf plant for Japan in 1989, approximately half of all of the gas produced in Australia has been exported. Goldman Sachs estimates that by 2020 Australia will become the world leader in the production of LNG.⁶ Many submissions to this Inquiry also noted the potential for Australia to become the world's largest producer of LNG.⁷

1.3 Indeed, as the seven LNG projects currently under construction come online, Australian production of LNG for export will increase from the current 24 million tonnes per annum to around 87 million tonnes per annum.⁸ Although determining the domestic impact of this increase is complicated by the lack of a specific global 'market price' for natural gas, it is clear that the export of natural gas (and its associated products) will become a fundamental component of the Australian gross domestic product (GDP).

1.4 Furthermore, the export of Australian natural gas into Asian markets is an increasingly important component of the global energy challenge, particularly where it is used as a substitute for coal. The increasing global use of natural gas as an energy fuel source alternative to other conventional fuels such as oil and coal represents a positive step in world environmental terms. The scale of the global energy, climate and resources challenge that the world faces is significant: the United Nations projects a world population increase in the order of 50 per cent by 2050, generating a rise in global energy demand and environmental stress.⁹ As a fuel source, natural gas yields more energy per gram than any other hydrocarbon.¹⁰ Furthermore, natural gas produces

5 Geoscience Australia, *Petroleum reserves by basin, as at 1 January 2011*, May 2012. Available at: <http://www.ga.gov.au/products-services/publications/oil-gas-resources-australia/2010/reserves/table-1.html>. Accessed on 8 November 2013.

6 Goldman Sachs, *Top 360 projects – LNG: plenty of expensive opportunities, a few jewels and little supply growth in sight*, 11 December 2012, p 6.

7 See, for example, Submission No. 11 from the Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 2; Submission No. 12 from the Australian Petroleum Production and Exploration Association, 30 August 2013, p 8; Submission No. 19 from INPEX Operations Australia, 30 August 2013, p 5; Submission No. 24 from Woodside Petroleum, 4 September 2013, p 9.

8 Three LNG plants—the North West Shelf and Pluto plants in Karratha, and the Darwin LNG plant in Darwin—are currently operational in Australia. A further seven—the Gorgon, Ichthys, Wheatstone, Prelude, Queensland Curtis, Australia Pacific and Gladstone LNG plants—are currently under construction.

9 United Nations, Population Division (Department of Economic and Social Affairs), *World population prospects: The 2012 revision*, June 2013. Available at: <http://esa.un.org/wpp/>. Accessed on 8 November 2013.

10 A mole of methane—the fundamental component of natural gas—weighs 16 grams. As a fuel source, methane produces about 55.7 kJ/g.

‘virtually no sulphur emissions, far lower levels of nitrous oxides, 25%–30% less carbon dioxide than oil, and 40%–45% less carbon dioxide than coal.’¹¹

1.5 In Australia, there is a major economic benefit derived from exporting LNG. In the 2012–2013 financial year, export production reached a record 20 million tonnes, with a sales value of \$12.5 billion—a figure representing more than 10 per cent of the total value of Western Australian merchandise exports in that period.¹² Over the next four years, the Department of State Development (DSD) expects WA’s export production of natural gas will increase by nearly 250 per cent to just short of 50 million tonnes per annum.¹³ Furthermore, the projects that account for this expanded production are all projected to operate for at least the next 25 years.¹⁴ LNG export revenue will provide a strong foundation for much of the Western Australian economy for many years to come.

1.6 The extent to which WA’s economy is able to benefit from the production of LNG, however, is not limited to export revenue. For example, Woodside reports that the North West Shelf project contributed:

- over \$70 billion or approximately one per cent per annum to Australia’s GDP;
- over \$40 billion in increased household consumption;
- over \$90 billion or approximately 5 per cent per annum to Western Australia’s gross state product (GSP); and
- approximately \$0.9 billion per annum to State and local government revenue.¹⁵

11 Herberg, Mikkal, ‘Natural gas in Asia: History and prospects,’ Pacific Energy Summit, Jakarta, Indonesia, February 2011. Available at: http://www.nbr.org/downloads/pdfs/eta/PES_2011_Herberg.pdf. Accessed on 2 January 2014.

12 Department of State Development, Western Australia, *Western Australia economic profile – October 2013*, October 2013. Available at: <http://www.dsd.wa.gov.au/documents/001272.mike.thomas.pdf>. Accessed on 4 November 2013.

13 *ibid.*

14 Submission No. 15 from Shell in Australia, 30 August 2013, p 7. Shell’s ‘Prelude’ FLNG project is projected to operate ‘for about 25 years,’ while Chevron’s ‘Gorgon’ and ‘Wheatstone’ projects are projected to operate for at least 30 years.

15 Woodside Energy Ltd, *North West Shelf Venture drives economic transformation in Australia*, Media Statement, Perth, 20 October 2009.

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Figure 1.1: The Woodside-operated North West Shelf gas plant, Karratha.¹⁶



1.7 As will be demonstrated throughout this report, the exploration, development, production and export of LNG has created considerable employment and supply opportunities for Australian and Western Australian workers and companies, and required investment in WA's engineering, design, fabrication, manufacturing, construction and ancillary services sectors. The production of LNG has also made a vital contribution to local manufacturing and power generation industries through the supply of domestic gas. Issues relating to domestic gas supply are discussed further in Chapter 8.

1.8 This economic benefit from LNG is exemplified by the largest engineering project currently under construction in Australia, namely Chevron's Gorgon LNG project on Barrow Island in WA's north west. The construction phase of this project created jobs for more than 10,000 people around Australia. Chevron estimates that by 2015, when the Gorgon project begins operations, it will have spent more than \$30 billion on Australian goods and services.¹⁷ As the Australian Manufacturing Workers' Union (AMWU) states, 'the contribution our natural resource wealth makes to Western Australia reveals a much deeper and broader relationship covering capital investment,

16 Woodside Petroleum, *Image gallery*. Available at: <http://www.woodside.com.au/investors-media/resources/pages/image-gallery.aspx>. Accessed on 14 April 2014.

17 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 2.

employment opportunities, skills development, government revenue and local business opportunities.¹⁸

Current (un)conventional natural gas reserves

- 1.9 In May 2013 the Department of Mines and Petroleum (DMP) estimated that, in total, the various basins off the Western Australian coastline contained probable reserves¹⁹ of around 125 trillion cubic feet (tcf) of natural gas.²⁰ Such reserves of natural gas would provide almost 100 years of LNG and domestic gas at the current rate of production.
- 1.10 Although certainly vast, these reserves are not limitless. If, for example, all of the committed and proposed LNG projects are brought into production, 125 tcf of natural gas reserves would only provide supply for about 35 years of production. Under such a scenario, a significant and challenging pinch point in domestic gas supply would occur sooner rather than later.
- 1.11 The 2011 report *Inquiry into domestic gas prices* considered the implications of such a pinch point in supply, particularly in relation to a potential decrease in domestic gas supply by the North West Shelf joint venture.²¹ In the course of this current Inquiry, the Committee has heard evidence to suggest that the production of natural gas for supply to the domestic market by the North West Shelf plant is far from guaranteed beyond 2020, with the joint venture partners likely to prioritise the production of LNG for the export market.
- 1.12 The supply of natural gas (whether for domestic use or export as LNG) and the commitment to develop projects depends not only on resources being available, but also on the economics of development and project operation. Many factors bear upon development and operating costs, and as such project commerciality turns heavily upon estimated gas volumes and prices. In particular the price of liquids (condensate and crudes) is a major factor in determining viability.
- 1.13 Where floating LNG (FLNG) technology is used to develop Australian natural gas reserves, none of that gas will be made available for supply to the domestic market. As such, a proliferation of FLNG technology will potentially accelerate the previously mentioned pinch point in domestic gas supply.

18 Submission No. 8 from Australian Manufacturing Workers Union, 30 August 2013, p 4.

19 Probable reserves, sometimes referred to as 2P reserves or P50 estimates, are those shown by geological and engineering research to have an even (50 per cent) confidence level of recovery.

20 Department of Mines and Petroleum, Western Australia, *Petroleum in Western Australia*, May 2013, p 39.

21 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Western Australia, 24 March 2011.

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- 1.14 According to the DMP, it is possible, and perhaps likely, that the commerciality of large onshore unconventional gas resources such as shale and tight gas, estimated by the DMP to be in the region of 280 tcf, will be demonstrated in the next decade.²² If this does occur, it would alleviate the potential domestic gas supply issue. At the present time, however, the possibility of developing onshore, unconventional gas for domestic supply remains speculative.

Current Australian LNG projects

- 1.15 Three LNG plants—the North West Shelf and Pluto plants in Karratha, and the Darwin LNG plant in Darwin—are currently operational in Australia.
- 1.16 In addition to these three operational LNG plants, a further seven are currently under construction, six of which are onshore plants. In Western Australia, Chevron is engaged in the construction of two major LNG export facilities, the Gorgon plant on Barrow Island and the Wheatstone plant near Onslow. Both of these will process gas from nearby, albeit offshore, fields. In Darwin, INPEX is constructing a plant that will process gas from the Ichthys field. Despite that field being closer in proximity to the WA coastline, gas from the Ichthys project will be piped through an 889km pipeline to a processing plant in Darwin.²³ In Queensland, three adjacent LNG plants are currently under simultaneous construction on Curtis Island. Each of these plants will process ‘unconventional’ coal seam gas for export as LNG. The seventh and final LNG project currently under construction is Shell’s Prelude FLNG vessel, which is being primarily built in the Samsung Heavy Industries shipbuilding facility in Geoje, South Korea.²⁴
- 1.17 A further six potential Australian gas export projects are currently under consideration. Two of these—Arrow and Fisherman’s Landing—are Queensland coal seam gas projects. The remaining four—Browse, Bonaparte, Scarborough and Cash Maple—are projects based upon conventional resource deposits in waters off the Western Australian coastline. While PTTEP’s Cash Maple project is still in its infancy, the leaseholders of the Browse,²⁵ Bonaparte²⁶ and Scarborough²⁷ fields have all proclaimed FLNG technology to be the preferred development method.

22 Department of Mines and Petroleum, Western Australia, *Petroleum in Western Australia*, September 2013, p 5.

23 Mr Bill Townsend, General Manager, External Affairs and Joint Venture, INPEX, *Letter*, 7 November 2013.

24 Submission No. 15 from Shell in Australia, 30 August 2013, p 8.

25 Submission No. 24 from Woodside Petroleum, 3 September 2013, p 6.

26 Submission No. 29 from Santos, 16 October 2013, p 3.

27 Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, p 2.

Liquefied natural gas

- 1.18 An appreciation of the economic implications of exporting natural gas requires an understanding of the complex LNG production process. In its natural state, gas does not lend itself to efficient export. To overcome this problem, natural gas is refined and then liquefied for sea transport. The liquefaction process produces liquefied natural gas or LNG—a product that is 1/600th the volume of natural gas in its gaseous state. This process, however, presents a series of significant challenges. The gas must first be refined to remove various components, including valuable commodities such as condensate and liquefied petroleum gases (LPGs, such as butane and propane) and impurities such as mercury, water and carbon dioxide. It is then progressively chilled until it reaches a temperature of approximately -162°C and condenses into liquid form. Storing and transporting the resource at this temperature presents its own major challenges. The production and transport of LNG thus demands a combination of painstaking design and highly-skilled manufacture, all of which is informed by a detailed understanding of the science of cryogenics.²⁸ The additional revenues gained by marketing condensate and LPGs is a significant factor in project economics.
- 1.19 Conventionally, the development of offshore natural gas resources for export has required the construction of custom-made onshore processing and liquefaction plants.²⁹ In essence, gas from an undersea reservoir is piped to these facilities where it is refined, liquefied and stored before being loaded onto sea vessels for export. In more recent times, advances in naval architecture and engineering have seen an increase in the use of offshore componentry—especially to develop resources in relatively remote locations—including such things as compression platform units (CPUs) and floating production, storage and offloading (FPSO) vessels.³⁰ In effect, each of these technologies has increased the extent to which gas and oil is processed and refined offshore.
- 1.20 To date, however, the liquefaction of gas for export has always taken place onshore, mainly because while the process of turning natural gas into LNG is complex and risky, onshore liquefaction is by now proven technology. Furthermore, significant economies of scale can be achieved with land-based LNG infrastructure. As has been the case with the North West Shelf project, onshore production capacity can be progressively upgraded to monetise successful exploration campaigns.

28 The Committee conducted site visits of various gas liquefaction facilities, including the North West Shelf and Darwin LNG export plants, in June 2013. The Committee's understanding of the LNG production process was enhanced by Mr Peter Wyse of Energy Developments Limited, Ms Alisha Stearne, Ms Michelle Grady and Mr Tony Aleckson of Woodside Petroleum, and Mr Jason Fior and Ms Jett Street of ConocoPhillips Australia.

29 Mr Robert Cole, Executive Director, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 2.

30 Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 4.

Floating LNG

- 1.21 While FLNG technology represents an important departure from this established practice, the notion that liquefaction might be performed offshore is not new, and can be traced back to the 1970s.³¹ Nevertheless, FLNG research remained at the conceptual level through much of the 1980s.³²
- 1.22 The latter part of the 1980s saw various oil and gas production companies conduct feasibility studies into FLNG. These studies showed FLNG projects to be unviable at that time.³³ Nevertheless, Royal Dutch Shell continued research into the concept during the 1990s. In 1999, research conducted in support of the joint industry project 'Azure' led to further progress in FLNG design. This culminated in 2008 when Shell formed a Basic Design Package for FLNG vessels, in line with a 'design one, build many' principle.³⁴
- 1.23 In May 2011 Shell took a positive final investment decision (FID) to develop the Prelude and Concerto natural gas fields with its FLNG technology. This was the first positive development decision based on FLNG technology anywhere in the world. Scheduled to begin operation by 2017, the Prelude plant will likely become the world's second ever FLNG plant.³⁵ According to Shell, the gas fields it will develop with the FLNG plant have 'around 3 trillion cubic feet of liquids-rich gas.'³⁶ Shell argues that these 'relatively small size' gas fields, when combined with their 'remote location,' make them 'ideal candidate[s] for development via Shell's FLNG technology' as development using conventional onshore LNG processing would not be economically viable.³⁷
- 1.24 In April 2013, Woodside announced that it had abandoned plans for an onshore gas liquefaction plant at James Price Point, and had 'entered into an agreement with Shell

31 Terry, M.C., 'Floating offshore LNG liquefaction facility – A cost effective alternative,' Paper presented at the 7th Annual Offshore Technology Conference, Houston, May 1975.

32 For a history of the development of FLNG technology, see: Terry, M.C., 'Plans for a floating LNG facility constructed of prestressed concrete,' Paper presented at the 46th Annual California Regional Meeting of the Society of Petroleum Engineers of AIME, California, April 1976; and Det Norske Veritas, *FLNG – The culmination of 34 years of LNG research*, 16 January 2013. Available at: <http://blogs.dnv.com/lng/2013/01/flng-the-culmination-of-34-years-of-lng-research/>. Accessed on 25 October 2013.

33 Saeid Mokhtab and David Wood, 'Breaking the offshore LNG stalemate,' *World Oil Online*, April 2007. Available at: <http://www.worldoil.com/April-2007-Breaking-the-offshore-LNG-stalemate.html>. Accessed on 25 October 2013.

34 Mr Steven Kauffman, Engineering Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 5.

35 In Malaysia, PETRONAS took a positive Final Investment Decision to use FLNG technology to develop the Kanowit gas field in 2012. This FLNG project is smaller in scope than Shell's Prelude project: Prelude's annual production will be about three times that of the PETRONAS vessel. It is expected that the PETRONAS vessel will be deployed and operational by 2015.

36 Shell in Australia, *Prelude FLNG*. Available at: <http://www.shell.com.au/aboutshell/who-we-are/shell-au/operations/upstream/prelude.html>. Accessed on 10 June 2013.

37 Shell in Australia, *Prelude FLNG*. Available at: <http://www.shell.com.au/aboutshell/who-we-are/shell-au/operations/upstream/prelude.html>. Accessed on 10 June 2013.

that sets out the key principles that would apply if the Browse resources are developed using Shell's [FLNG] technology.³⁸ Others such as ExxonMobil and GDF SUEZ Bonaparte have also signalled their intent to use FLNG technology to develop the Scarborough and Bonaparte fields respectively.³⁹

1.25 Notwithstanding the April announcement, a key specification within the Browse project retention leases was that 'the lessee shall select the development concept likely to be commercially viable at the earliest time,' and that 'this shall be the concept whereby gas is processed at the Kimberly LNG precinct.'⁴⁰ That is, at the time of Woodside's FLNG announcement, it was a condition of the retention leases covering the Browse project's Brecknock, Calliance and Torosa fields that the gas be processed and liquefied at the proposed Kimberley LNG precinct.⁴¹

1.26 Among natural gas fields in waters off the Western Australian coastline, the Torosa field within the Browse Basin is unique in that it straddles both state and federal waters. Scott Reef, an atoll-like reef situated atop the Torosa field, is part of Western Australia.⁴² As a consequence, five of the seven retention leases pertaining to the Browse project fields are Commonwealth leases, while the remaining two are Western Australian leases.

1.27 In practice, the five Commonwealth leases have been historically administered by a joint authority comprising Commonwealth and state government representatives. Decisions as to compliance with the Commonwealth lease requirements, and on variations to those leases, are to be made by this joint authority. In August 2013, however, a variation to the Commonwealth leases was unilaterally approved by the then Commonwealth Minister for Resources and Energy, Hon Gary Gray, MP. This variation waived the requirement that the gas be processed 'at the Kimberley LNG precinct,' and, thus, allowed 'the Browse Joint Venture participants to progress the selection of an alternative development concept and commence related design and engineering work.'⁴³ Conditions for the two Western Australian leases were identical to

38 *Browse LNG Development Update*, Media Statement, Woodside Petroleum, 30 April 2013. Available at: <http://www.woodside.com.au/Investors-Media/Announcements/Documents/30.04.2013%20Browse%20LNG%20Development%20Update.pdf>. Accessed on 22 November 2013.

39 Submission No. 29 from Santos, 16 October 2013, p 3; and Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, p 2.

40 Commonwealth of Australia, Variation of Petroleum Retention Lease WA-28-R(R1), Attachment A, Condition (1) April 2012; and State of Western Australia, Petroleum Retention Lease R2(R1), Attachment A, Condition (1), April 2012.

41 See, for example, Petroleum Retention Lease TR/5 (R1) between the State of Western Australia and the Joint Venture partners, 24 December 2009.

42 Gilmour, James; Smith, Luke; Cook, Kylie; and Pincock, Stephen, *Discovering Scott Reef*, Woodside and the Australian Institute of Marine Science, 2013, p 16.

43 *Variation to Commonwealth Browse Retention Leases approved*, Media Statement, Woodside Petroleum, 2 August 2013. Available at: <http://www.woodside.com.au/Investors->

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those on the Commonwealth leases, with the Western Australian leases being administered by the state government.

- 1.28 There are two important points to be made here. First, while the Commonwealth has varied its leases, no variation has been made to the state leases. Second, moving from the basis of design (BOD) to front-end engineering design (FEED) phase of the project would require the approval of the Joint Venture partners. There is significant work yet to be undertaken by Woodside before an FID can be made regarding a Browse FLNG project.

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While the Commonwealth Government has approved the variation to the five Browse Retention Leases in Commonwealth waters, the Western Australian Government has not approved the variation to the two Browse Retention Leases in state waters.

- 1.29 In effect, the Commonwealth's decision permitted Woodside Petroleum, as operator of the Browse project, to begin active consideration of FLNG as a development option. In September 2013 the Browse Joint Venture partners announced that BOD work on a concept using Shell's FLNG technology had been initiated. It is expected that the project will move into the FEED phase by 2014, with FID due in 2015.
- 1.30 While Shell has proceeded with an FLNG project and Woodside and others are planning to develop gas reserves using this technology, it remains unproven. Furthermore, advocates for FLNG, such as ExxonMobil, GDF SUEZ Bonaparte and Santos, have acknowledged that it involves a significant compromise in relation to increased operating costs over the conventional production method.⁴⁴

Stranded gas

- 1.31 Speaking in support of developing gas reserves using FLNG technology, oil and gas companies commonly referred to the term 'stranded gas'.⁴⁵ The argument presented was that some fields, such as the Browse project leasehold fields, are not able to be economically developed using an onshore gas processing and liquefaction plant, and as such contain resources that are effectively stranded. In discussing Woodside's decision

Media/Announcements/Documents/02.08.2013%20Variation%20to%20Commonwealth%20Browse%20Retention%20Leases%20Approved.pdf. Accessed on 22 November 2013.

44 Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, p 10. Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte, *Transcript of Evidence*, 21 October 2013, p 7. Mr John Anderson, Vice-President WA and NT, Santos Ltd, *Transcript of Evidence*, 21 October 2013, p 3.

45 Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, pp 3-4. Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte, *Transcript of Evidence*, 21 October 2013, p 2. Mr John Anderson, Vice-President WA and NT, Santos Ltd, *Transcript of Evidence*, 21 October 2013, p 2. Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2.

to consider FLNG for the Browse fields, Mr Andrew Smith of Shell in Australia stated that ‘if the Browse development had had to be James Price Point... there would have been no project.’⁴⁶

- 1.32 The use of the term ‘stranded gas’ bears closer scrutiny. In the late 1990s and early 2000s ‘stranded gas’ came:

*into vogue to describe discovered but undeveloped gas reserves of at least 2,000 trillion cubic feet (tcf) worldwide. The term often carries the implication that the gas is not only remote, but also mainly in small deposits.*⁴⁷

- 1.33 Four months subsequent to Shell’s positive FID on the Prelude project, Chevron took a positive FID on its Wheatstone project proposal. The Wheatstone project will bring large quantities of gas from numerous offshore fields to an onshore refinement and liquefaction plant currently under construction near Onslow.⁴⁸ That is, notwithstanding Shell’s development of commercially viable FLNG technology, Chevron’s decision indicated that in 2011 the case for using FLNG technology was to develop relatively smaller, remotely-located gas reserves and that larger reserves would continue to be developed via conventional, onshore methods.

- 1.34 This, too, is the understanding of the Department of Commerce (DCom):

*FLNG is a trend that was initially presented as something that would be devoted to small, isolated deposits that were uneconomical to develop through conventional onshore processing.*⁴⁹

- 1.35 In other words, such fields ‘lack any immediate prospect of development for markets’ using existing LNG technology.⁵⁰

- 1.36 LNG production facilities traditionally have been built onshore. For the Australian Petroleum Production and Exploration Association (APPEA), the development of LNG

46 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 8.

47 Thackeray, Fred and Leckie, George, ‘Stranded gas: A vital resource,’ *Petroleum economist*, 1 May 2002.

48 *Chevron gives Wheatstone project green light*, Media Statement, Chevron Australia, 26 September 2011. Available at: <http://www.chevronaustralia.com/media/mediastatements/wheatstone.aspx?NewsItem=85dc19d5-a958-47f9-a168-670fef9ac5f1>. Accessed on 8 November 2013.

49 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 2.

50 Thackeray, Fred and Leckie, George, ‘Stranded gas: A vital resource,’ *Petroleum Economist*, 1 May 2002.

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technologies was an innovative solution to make 'natural gas available to more distant markets that were not previously able to be reached by pipeline.'⁵¹

- 1.37 Similarly, the development of FPSOs was a technological solution to the challenge presented by marginal or uncommercial fields, especially in remote or deep water locations. They were able to produce large quantities of high pressure oil and associated gas, and were suitable for operating in areas subject to cyclones.⁵²
- 1.38 The Committee received considerable evidence to the effect that FLNG was designed and built from existing FPSO technologies and that it represented the continuing evolution of LNG technology.⁵³ For companies such as GDF SUEZ Bonaparte, FLNG represents the latest innovative offshore technology.⁵⁴ In this light, FLNG technology is cited as the key to unlocking technologically stranded gas, that is, gas that could not be developed by existing technologies.
- 1.39 However, more recent use of the term 'stranded gas' places commerciality at the forefront of considerations, with particular emphasis placed on the capital cost of onshore developments. By early 2013, and for various reasons, Australian gas export projects were facing growing capital costs, and industry began to consider FLNG technology not only for small and remote gas fields, but also for larger fields for which the sum of capital expenditure required to develop would be difficult to forecast with precision.
- 1.40 This situation was summarised by Shell as follows:

In Australia, significant cost pressures have seen material increases in announced capital expenditures for major onshore LNG projects. In some cases, cost overruns have been up to 50% in aggregate resulting in more than US\$30 billion additional capital spend to that envisaged at the time of the final investment decisions. The FLNG concept simplifies and reduces construction scope substantially since it does not require separate offshore processing platforms, long pipelines to shore, near-shore works (dredging of shipping channels or jetty

51 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 5.

52 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 5; Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 68.

53 See, for example, Submission No. 27 from Department of State Development, 2 October 2013, pp 2–3; Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 5; Mr Luke Musgrave, Vice president, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, pp 2–3.

54 Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte Pty Ltd, *Transcript of Evidence*, 21 October 2013, p 2.

*construction) or the civil works associated with the development of an onshore LNG site.*⁵⁵

1.41 Added into this equation was a level of uncertainty as to how the proliferation of unconventional gas—and in particular, the possible export of shale gas from the United States of America (US)—might affect the ability of gas producers to secure the necessary price and purchase commitments from gas consumers to underwrite their export projects.

1.42 The notion that FLNG technology might be used for larger gas fields gained credence with Woodside's April 2013 decision to use FLNG.⁵⁶ This decision was explained as being based squarely upon the capital expenditure that would be required for an onshore project. Mr Robert Cole, Executive Director, Woodside, argued that:

*capital costs have grown almost exponentially over the past five or six years, and that was a key metric that really depressed the economics of the project... We are not talking about costs just rising in Australia; [LNG project] costs have risen globally in this industry right around the world.*⁵⁷

1.43 According to Shell:

*as gas basins mature, exploration naturally moves out into more remote locations, further offshore, and into deeper water depths. More remote fields face a much higher cost of development, making land-based LNG solutions more difficult—both technically and economically. FLNG has become widely recognised as a viable (or possibly the only viable) development option for smaller and/or more remote gas resources, as is the case for Prelude.*⁵⁸

1.44 Shell and Woodside are not alone in advocating the use of FLNG technology to commercialise fields for LNG production using the otherwise more capital-intensive onshore processing method, with companies such as ExxonMobil, GDF SUEZ Bonaparte,

55 Submission No. 15 from Shell in Australia, 30 August 2013, p 8.

56 *Browse LNG Development Update*, Media Statement, Woodside Petroleum, 30 April 2013. Available at: <http://www.woodside.com.au/Investors-Media/Announcements/Documents/30.04.2013%20Browse%20LNG%20Development%20Update.pdf>. Accessed on 22 November 2013.

57 Mr Robert Cole, Executive Director, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 10.

58 Submission No. 15 from Shell in Australia, 30 August 2013, p 8.

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Santos and INPEX seeing FLNG as a means of developing what they say would be otherwise unviable fields.⁵⁹

1.45 For APPEA, FLNG will provide operators:

*with a means of potentially commercialising deepwater or greenfield gas resources that would otherwise be too small, expensive or technically difficult to extract.*⁶⁰

1.46 In discussing the development of its Petrel and Tern gas fields, GDF SUEZ Bonaparte explained that these fields:

*were discovered more than 40 years ago and have long been considered too remote and relatively small to develop economically by conventional means. They are typical examples of what is known as stranded gas fields, so for 40 years no-one has been able to find a way to get this gas out of the ground and bring it to market.*⁶¹

1.47 In June 2013, Shell confirmed that FLNG was:

*another response to that environment [the position of the Australian LNG industry] and to remain competitive. It has evolved in recent years to a solution to smaller gas resources or more remote and is now being considered by people in Australia and in other countries as a solution for cost competitiveness and to be competitive in that market we have been talking about.*⁶²

59 Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, pp 3-4. Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte, *Transcript of Evidence*, 21 October 2013, p 2. Mr John Anderson, Vice-President WA and NT, Santos Ltd, *Transcript of Evidence*, 21 October 2013, p 2. Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2.

60 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 13.

61 Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte Pty Ltd, *Transcript of Evidence*, 21 October 2013, pp 1–2. The Tern and Petrel gas fields are located approximately 250 kilometres west of Darwin in the Bonaparte Gulf and about 1,000 kilometres north east of Broome.

62 Mr Steven Phimister, General Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 4.

FLNG provides a viable means of developing remote and isolated gas fields.

After exhaustive studies... we have selected floating liquefied natural gas as the lead development concept for Scarborough. As a remote and isolated gas resource, developing the Scarborough field remains challenged due to its distance offshore, its water depth, its ocean conditions and its resource characteristics. Some relatively recent technology enhancements that are incorporated into FLNG could provide an opportunity to overcome these challenges and enable development of the Scarborough resource. In the case of a remote gas field like Scarborough, FLNG technology could allow development of this field which otherwise may remain stranded. I think that is testimony to the fact that we discovered this in 1979 and have been working constantly to look for the optimum development opportunity. With the advent of new technologies, we have found a viable means of developing Scarborough, otherwise that gas had been stranded and, in the absence of technology, may well have remained stranded for some time.

**Mr Luke Musgrave, Vice president, LNG, ExxonMobil (Australia),
Transcript of Evidence, 21 October 2013.**

- 1.48 Thus the use of FLNG technology came to be promoted for not only previously ‘technologically stranded gas,’ but to all fields where it will reduce capital expenditure and increase company profits.

Finding 2

‘Stranded gas’ no longer refers to only small and isolated deposits. Proponents of FLNG technology use ‘stranded gas’ to refer to gas that, for a variety of reasons, they do not consider economically viable to develop at a particular period of time.

- 1.49 The focus on commerciality in discussions about ‘stranded gas’ can be tied to two major factors. First, developing new technology is an expensive process and, once developed, companies reasonably look to opportunities to make use of their innovations. Thus, it is not unreasonable for Shell to seek to maximise its investment in FLNG technology.
- 1.50 Second is the commercial viability test for granting and renewal of Retention Leases in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGGS Act). If a viable discovery of petroleum is made under the terms of an Exploration Permit, the petroleum title to that acreage will progress to either a Production Licence or a Retention Lease. Section 142 of the OPGGS Act stipulates that a Retention Lease will be granted if the holder of an Exploration Permit is able to satisfy the Joint Authority that, while the area in question contains petroleum:

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*the recovery of petroleum from that area is not, at the time of the application, commercially viable but is likely to become commercially viable within 15 years after that time.*⁶³

- 1.51 Under s 139 of the OPGGS Act, Retention Leases remain in force for a period of five years. Before this period expires, the title holder may either apply to convert a Retention Lease into a Production Licence (so as to begin production of the petroleum resource) or, under s 154 of the OPGGS Act, apply to have a Retention Lease renewed for a further five year period. In support of an application to renew a Retention Lease, the lessee is required to again demonstrate that the recovery of petroleum from the area in question is not currently commercially viable, but is likely to become commercially viable within 15 years.
- 1.52 The term 'stranded gas' has become the preferred descriptor of fields that leaseholders claim among their aggregated "proven plus probable petroleum reserves," while deferring a decision as to the development of these reserves into the future. On this point, the Committee notes that WA's first offshore gas discovery was made at Scott Reef in the Browse Basin in July 1971. Almost 43 years on, title to that discovery is still held under a Retention Lease.⁶⁴
- 1.53 In effect, s 142 and s 154 of the OPGGS Act requires the title holder to demonstrate the existence of stranded gas in making an application for the grant or renewal of a Retention Lease. The Committee notes in Chapter 2 that there is a problem with the current and historic administration of Retention Leases, in that the OPGGS Act does not make explicit what is contemplated by the term 'commercially viable.' While the commercial viability of any project is a function of a number of factors, the OPGGS Act does not facilitate a market test of how commercially viable the development of a petroleum resource may or may not be. Instead, the Joint Authority is required to make an assessment of the claims put by the title holder alone. Issues relating to commercial viability and profitability are discussed in Chapter 14 (Volume 2).
- 1.54 Complicating this assessment is the fact that producing LNG—however it is done—is an expensive undertaking. Oil and gas companies might reasonably turn to using FLNG technology as a method for producing LNG so as to maximise the return to their shareholders. However, the Committee does not accept that large fields—such as the Torosa or Scarborough fields—could only be developed using FLNG technology, or that producing LNG for export is the only viable way to commercialise these natural gas resources. The Committee has heard evidence suggesting that some gas fields in Western Australia, which the leaseholders have argued could only be economically developed using FLNG technology, could provide ample resources for commercially

63 *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cth)*, s 142.

64 Mr Nenad Ninkov, Member, DomGas Alliance, *Transcript of Briefing*, 28 June 2013, p 9.

viable domestic gas projects.⁶⁵ In fact, a consultant's report provided as evidence suggests that both the Torosa and Scarborough fields could be commercially developed as domestic gas fields by 2020, with both yielding a 12 per cent rate of return at a gas price in the vicinity of \$6 per GJ.⁶⁶ The Committee believes that such a price would be an attractive proposition for consumers within the local market, particularly in light of the finding in the 2011 Report that 'prices for gas under new contracts [in the WA domestic market] have recently been reported to be in the range of approximately \$5.55 to \$9.25 per GJ.'⁶⁷

- 1.55 Clearly, the factors bearing upon commercial viability of an LNG project are very different from those bearing upon that of a domestic gas project.
- 1.56 Unfortunately, the present function of the OPGGS Act precludes the possibility of considering alternative development proposals that may exist, and allows oil and gas companies to suggest that the development of some gas fields off the WA coastline would not occur at all were it not for FLNG technology.
- 1.57 It is true that as field size diminishes, the risk of capital overspend increases, and FLNG may provide a viable means of developing a relatively small and isolated field that might otherwise be not be developed. Given this, the Committee agrees with Mr Ian Bray, Assistant National Secretary of the Maritime Union of Australia (MUA), who argued that 'the concept of FLNG would probably have come at some time.'⁶⁸ Plainly, where it is used to develop a petroleum resource that might otherwise never be developed, FLNG technology is an appropriate development option. What is lacking is any method of assessing whether or not there may be alternative development proposals for fields covered by Retention Leases that may otherwise be held for prolonged periods.
- 1.58 Retention Leases are an important feature of the administration of Australian natural gas resources. In a broad sense, Retention Leases permit prospective LNG producers the opportunity to aggregate reserves so as to be able to attract sufficient finance for a proposed project. Furthermore, the Committee acknowledges that any amendment to the OPGGS Act could have a negative impact on Australia's sovereign risk. The Committee believes, however, that the current legislative landscape does not permit sufficient scope for the Joint Authority to test claims regarding the commercial viability of field development. At the very least, allowing market forces to bear upon the process of Retention Lease renewal would permit a more robust test of whether a gas

65 Submission No. 57 Closed Submission.

66 Submission No. 57 Closed Submission.

67 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Western Australia, 24 March 2011, p 54.

68 Mr Ian Bray, Assistant National Secretary, Maritime Union of Australia, *Transcript of Evidence*, 1 November 2013, p 8.

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field is truly stranded, and whether FLNG technology is the only method by which it might be economically developed.

Finding 3

The *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) does not provide for consideration of alternative development proposals in relation to reviewing the renewal of Retention Leases or granting of production licences.

Finding 4

Renewing Retention Leases may not be in the best interests of the economic development of Western Australia.

Recommendation 1

The Western Australian Government negotiate with the Commonwealth Government to amend the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) to change the assessment of Retention Leases to include providing:

- the Joint Authority with the ability to invite competitive development proposals for the resource being considered; and
- the title holder with the opportunity to match any alternative development proposal or else surrender the title.

Property rights

1.59

All Australians are significant stakeholders in the natural resource wealth of the country. In Australia it is generally the case that, rather than landowners owning the resources beneath the surface of their lands, all minerals—including petroleum—are the property of the Crown.⁶⁹ Importantly, as Australia's Constitution does not confer federal jurisdiction over minerals, the power to legislate in relation to minerals within state boundaries is held by the relevant State. That is, property rights in Australian minerals are held by the Crown, in right of the State.⁷⁰

1.60

This means that the rights to mineral deposits in Australia are owned by the state in which they are located, with the relevant State Executive effectively holding these

69 At common law it is presumed that the owner of land also owns everything above or below that land, including minerals, with the exception of 'Royal metals' (gold and silver), the ownership of which was reserved for the Crown from as early as the sixteenth century. This 'reservation' of mineral ownership was extended to cover all minerals in Western Australia with the passage of the *Land Act 1898* (repealed) (WA). Since 1 January 1899 all new grants of freehold title in Western Australia have included a provision reserving all minerals for the Crown. For titles granted before 1899, the owner of the land is also the owner of any minerals (other than gold or silver) below the land, unless the owner's predecessor in title had transferred this ownership to someone else. See Hunt, Michael, *Mining Law in Western Australia*, Fourth Edition, Federation Press, Leichhardt, 2009, pp 35–36.

70 Hunt, Michael, *Mining law in Western Australia*, Fourth Edn, Federation Press, Leichhardt, 2009, p 36.

property rights on trust for the people of that state and exercising regulatory authority over the extraction of those minerals.⁷¹ Accordingly, to ensure that the citizens of a particular state are adequately compensated for the sale of their minerals, the State has imposed such things as mining royalty payments and taxes. In relinquishing ownership of these minerals, States are also able to apply environmental and social regulations relating to the process of their extraction.

1.61 An example of the way in which WA regulates the process of petroleum extraction was given by the Director General of DMP, Mr Richard Sellers. Mr Sellers explained that the current regulatory framework required project proponents to submit detailed field development plans to the Department prior to being given permission to develop some particular field.⁷² Owing to the fact that not all gas fields are the same, the composition of the field in question, and the proposed method of extraction, are major aspects of this plan.

1.62 In addition to natural gas, a gas field may contain a high proportion of natural gas condensates—low-density mixtures of various hydrocarbon liquids that exist in gaseous form. Owing to their high energy content, condensates are valuable. They are also more difficult to recover than dry natural gas as extracting condensates requires fields to be kept at a constant pressure through ‘reinjection’ during the process of extraction. According to Mr Sellers, ‘without a reinjection... there is significant possibility that condensate will be left in that reservoir in a way that will make it unextractable in the future.’⁷³

1.63 This point was expanded upon by the DMP’s Executive Director of Petroleum, Mr Jeffrey Haworth, who explained that as a:

*field gets depleted the pressure can drop to a point which goes below the dew point of condensate, which means that the condensate will drop out [turn to liquid]. Should it drop out it is irrecoverable.*⁷⁴

1.64 Although it is ordinarily in the interests of the relevant operator to maximise field recovery, as a field is depleted the costs associated with reinjection may make the process uneconomic. This gives rise to a divergence between the objectives of the operator, who will seek to maximise profit, and the regulator, who will prefer to see maximum resource recovery.

71 Reilly, Alexander, Appleby, Gabrielle, Grenfell, Laura and Lacey, Wendy, *Australian public law*, Oxford University Press, Melbourne, 2011, p 115.

72 Mr Richard Sellers, Director General, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 4.

73 *ibid.*

74 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 4.

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1.65 Unfortunately, the State's ability to regulate the process of mineral extraction is limited in relation to offshore mineral deposits. In those instances, following a 1975 determination by the High Court of Australia that the Commonwealth has sovereignty rights in Australian territorial seas, it is the Commonwealth Executive that holds property rights on trust for the Australian people.⁷⁵ This decision has limited the ability of the WA State Government to impose regulations upon the extraction of offshore minerals, chief among which is natural gas. Conversely, the Commonwealth Government is able to regulate this industry and does so through such mechanisms as the Petroleum Resource Rent Tax (PRRT), and environmental and human safety regulations.

1.66 Nevertheless, as petroleum companies have traditionally needed to use parcels of State-owned land for the construction of gas refining and liquefaction plants, the state government has been able to impose conditions upon such projects. For example, in 2006 WA developed and applied its 'WA Government Policy on Securing Domestic Gas Supplies' (the Reservation Policy). Under this policy, proponents of LNG export ventures are required to reserve up to 15 per cent of natural gas production for supply to the domestic market. This policy aims to secure a supply for Western Australian gas users, whose aggregate demand would likely be insufficient to underwrite the necessary large-scale capital investment required for developing many offshore gas resources. Woodside's Pluto project was the first project developed in Western Australia to be subject to the formal Reservation Policy. The Reservation Policy also applies to Chevron's Wheatstone project.

1.67 The 2006 development of the Reservation Policy effectively formalised the long-standing state government position that permission for any company to export natural gas from Western Australia is contingent upon that company also committing to supply gas to Western Australian consumers. In its submission, CMEWA noted that:

the government's domestic gas reservation position began in the 1980s with the North West Gas Development (Woodside) Agreement Act 1979, the state agreement for the development of the North West Shelf Project, containing provisions to secure a share of the gas reserves for domestic use.

At the time of the agreement, the government and project proponents negotiated risk and reward sharing from developing the domestic gas processing facilities. This included agreeing to terms for the exploration, development and production of domestic gas, the development of pipeline infrastructure and the domestic gas supply

75 *New South Wales v Commonwealth* [1975] HCA 58. Cited in Submission No. 18 from Department of Mines and Petroleum, Western Australia, 30 August 2013, p 3.

*contract for the government energy utility at the time. The agreement established the basis for consideration of the case by case implementation of the reservation policy, with issues such as land access considered in negotiations over subsequent state agreements, which enforce the domestic gas reservation policy.*⁷⁶

- 1.68 Chevron's Gorgon project, for which a State Agreement was made on 9 September 2003 (and is included as Schedule 1 to the *Barrow Island Act 2003* (WA)), is another example of a gas export project for which access to required land was sanctioned on the basis of strict environmental regulations, and an agreement by project proponents to supply a portion of the gas produced into the domestic market. This State Agreement, however, was made prior to the adoption of the formal Reservation Policy, and as such the domestic gas commitment by the project proponents is for the supply of a specific daily quantity of gas (specifically 300 TJ), as opposed to reserving a percentage amount of overall gas production for domestic supply.⁷⁷

The Committee

- 1.69 The Economics and Industry Standing Committee (the Committee) is a portfolio-related Committee of the Legislative Assembly of the Parliament of Western Australia. The Committee was appointed on 9 May 2013.
- 1.70 Pursuant to the Legislative Assembly's Standing Order 287(3) the Speaker determined that the Committee would have the portfolio responsibilities of: State Development, Mines and Petroleum, Fisheries, Regional Development, Lands, Tourism, Transport, Commerce, Science, Housing, Racing and Gaming, Planning, Energy, Water, Heritage, Agriculture and Food, Forestry and Small Business.⁷⁸

Conduct of the Inquiry

- 1.71 In accordance with Standing Order 287(2), on 22 May 2012 the Committee resolved to undertake an Inquiry into the economic implications for WA of the use of FLNG technology to develop the state's gas reserves. This Inquiry relates to the oversight of several of the Committee's inter-related portfolio responsibilities, including State Development, Mines and Petroleum, and Energy. The Terms of Reference for the Inquiry are contained in Appendix One.

76 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 10.

77 *Barrow Island Act 2003* (WA) Schedule 1, s 17.

78 Hon. Michael Sutherland, MLA, Speaker of the Legislative Assembly, Western Australia, Western Australia, *Parliamentary Debates* (Hansard), 16 April 2013, p 36.

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- 1.72 Advertisements outlining the Inquiry and calling for public submissions were placed in:
- *The West Australian* on 22 June 2013;
 - *The Australian* on 25 June 2013;
 - *The Financial Review* on 27 June 2013; and
 - *the WA Business News* on 4 July 2013.
- 1.73 To ensure that the Inquiry attracted a broad range of interested parties, an electronic media release was also issued on 23 May 2013. Furthermore, the Committee invited submissions from specific state government agencies, major oil and gas companies, and professional associations, including trade unions and industry groups.
- 1.74 In total, the Committee received 61 submissions.⁷⁹ Due to the nature of the Inquiry, submissions from particular stakeholder groups often made similar points. Given this, the Committee decided to quote only a small sample in relation to each topic or issue. This is not intended to diminish the importance of those submissions not directly referred to or quoted from. They remain an important factor in the Committee's consideration of the issues and provided much of the foundation upon which this report's findings and recommendations are made.
- 1.75 The Committee also conducted documentary research, received 18 briefings and held 31 formal evidence hearings, 8 of which were public and 23 closed.⁸⁰ The Committee issued media releases for the public hearings and notice of these was placed on the Parliament's web site. Subsequent transcripts of the briefings and the public hearings were made available by the same means.
- 1.76 Given the sensitive nature of much of the closed evidence, the Committee has not quoted from it extensively. Nevertheless, closed evidence has proven valuable and has influenced the findings and recommendations in this report.
- 1.77 The Committee appreciates the assistance of those who contributed to the Inquiry, particularly those who provided sensitive and commercial-in-confidence information. The Committee is disappointed that not all oil and gas companies were as helpful as they might have been, even when granted the capacity to provide closed evidence.
- 1.78 The Committee also notes that local manufacturing and fabricating businesses were reluctant to speak with the Committee. This was largely due to concerns that they would lose the opportunity to win future contracts. This is of great concern to the Committee. To ensure that the voices of these sectors were heard and incorporated into the report, the Committee ensured that it engaged with representative bodies such as the Australian Steel Institute (ASI) and the Chamber of Commerce and Industry of Western Australia (Inc) (CCIWA).

79 Submissions to the Inquiry are listed in Appendix Three.

80 Formal hearings are listed in Appendix Three and briefings in Appendix Four.

1.79 Committee members also attended a number of oil and gas conferences and events:

- *Western Australia's Energy Market Future*, panel discussion, University of Western Australia
- *Oil & Gas Procurement and Supply* conference, Brisbane
- *8th Annual LNG World Conference*, Perth
- *Perth Energy Forum 2013*, Wood Mackenzie, Perth
- *From offshore to onshore – the future of WA's gas market?*, Energy and Minerals Institute, Grattan Institute, APPEA and the International Energy Centre forum, Perth.

1.80 The Committee made a number of site visits in the North West of Western Australia and in Darwin, and received briefings from the following oil and gas companies, government agencies and tertiary institutions:

- site tour at the Woodside-operated North West Shelf gas processing plant;
- site tour of ACTO's open cycle power generation facility in Karratha;
- site tour at the Horizon Power Control Centre in Karratha;
- site tour of Energy Developments' Karratha LNG plant;
- visit with the Northern Territory Government's Department of Business and the Department of Mines and Energy;
- site tour at the ConocoPhillips-operated Darwin LNG plant;
- visit to Charles Darwin University, with a site tour of the North Australian Centre for Oil and Gas;
- visit to the University of Western Australia, with site tours of the Centre for Offshore Foundation Systems and the Large O-Tube;
- site tour of the Australian Marine Complex, including the Common User Facility and the Cvmec fabrication facility, south of Fremantle; and
- site tour of the Australian Centre for Energy and Process Training (ACEPT).

1.81 The purpose of these site visits and conference attendances was to allow the Committee to better understand the issues involved in the development and operations of on-shore gas processing plants and the associated offshore operations, the engineering fabrication and construction industries, and the subsea sector. It also afforded an opportunity to see and hear first-hand from senior company and government personnel, and to learn about the latest developments in the oil and gas industry, including the development of unconventional gas as a potential energy source.

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- 1.82 Shell in Australia has invited Members to visit locations of importance to the Prelude FLNG project, including Samsung's Goeje yard in South Korea and the Marin testing facility in The Netherlands. The Committee considers that such a visit is essential to its Inquiry. The Committee intends to undertake investigative travel relating to opportunities arising from FLNG development in Western Australia and the safety of FLNG operations.
- 1.83 Given the complex and technical nature of the Inquiry, the Committee also engaged Mr Bill Tinapple as a technical consultant. Mr Tinapple has extensive petroleum engineering experience and worked with DMP over many years. His assistance to the Committee was invaluable. The Committee notes that Mr Tinapple was the delegate to the Commonwealth–Western Australia Offshore Petroleum Joint Authority. Mr Tinapple did not participate in the Committee's deliberations on sections of the report relating to the Joint Authority.

A note on the terms of reference

- 1.84 While the complete terms of reference are provided in Appendix One, because of the amount of public and media attention received by the Inquiry and the controversial decision by Woodside to not proceed with the James Price Point gas processing development, it is important that some comments are made on the scope of the Inquiry.
- 1.85 As noted, the Committee resolved to undertake this Inquiry in May 2013. By this time, Shell had announced its intentions to develop the Prelude and Concerto gas fields using FLNG technology. Woodside was also re-considering its commitment to develop the Browse Basin fields using onshore gas processing at James Price Point. Since then, Woodside has announced its intention to develop these fields using FLNG. The Committee's Inquiry is into *economic implications* of decisions such as these, *not on the decision itself*.
- 1.86 There are two main points to be made here. First, in order to determine as far as is possible the economic impact of FLNG technology, it was necessary for the Committee to ask questions in relation to the oil and gas companies' decisions to use this technology and, importantly, not to use onshore processing facilities. This included asking companies for their projections and comparisons between onshore and offshore developments.
- 1.87 Second, and as this report demonstrates, while the Committee understands that companies make commercial decisions, this does not mean that the Committee necessarily accepts those decisions. For example, Woodside's current position on the development of the Browse fields, which was made during the course of the Inquiry, is not necessarily the best for Western Australians and Western Australian businesses

and workers. The Committee examined the impact of FLNG operations on the Western Australian economy and, therefore, its communities.

The importance of this Inquiry

- 1.88 Australia is currently the third largest LNG exporter in the world. Projections put Australia as likely to be the world's largest exporter of LNG by 2020. It has been estimated that 24 million tonnes of LNG, worth \$16.2 billion, was exported from Australia in 2012–13, with ninety per cent of this coming from two Western Australian projects—the North West Shelf Joint Venture project, and Pluto.
- 1.89 As previously noted, the development of Western Australia's natural gas resources has been vital to the economic prosperity of the state.
- 1.90 The state's natural gas is also essential for the supply of domestic gas for power generation, industry, value adding to mining products and households, which, in turn, creates further employment, wealth and community benefits for the state and its population.
- 1.91 As will be demonstrated throughout this report, there has been considerable work undertaken in the engineering design, fabrication, manufacturing and construction of offshore and onshore oil and gas projects. For example, in 1988, Woodside's Goodwyn A platform was designed and engineered in Perth. The 1990s saw the continuation of engineering and fabrication for such things as Woodside's Laminaria FPSO, and parts of Wandoo, including the concrete subsea jacket and topsides, were also fabricated locally. Additionally, the jacket, topside modules and piles for the wellhead platform, and the onshore storage tanks for the Blacktip gas field project were fabricated in WA. During 2000–2004, Woodside's LNG train 4 and North Rankin A were engineered in Perth.
- 1.92 Since the move to single source global supply chains, concurrent with the move to modularisation of gas processing plants, the amount of engineering and construction and fabrication work carried out in Western Australia has seriously declined, with much of the work conducted overseas. Similarly, onshore projects such as Pluto, Gorgon, Wheatstone and Ichthys have resulted in engineering and design work being carried out in overseas design centres such as Reading and Houston.
- 1.93 These changes have had a dramatic impact on local content providers.
- 1.94 Recently, as noted, there have been two significant announcements in relation to the use of FLNG technology. First, Shell announced that the Prelude and Concerto fields would be developed using FLNG technology. Second, Woodside nominated FLNG for the potential development of the Browse fields, rather than onshore processing at James Price Point, and is now proceeding to BOD on that basis.

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- 1.95 The Committee is concerned that the use of FLNG technology as the preferred model to develop Australian gas fields will largely mean that the Australian construction and fabrication sectors will face some serious challenges.
- 1.96 It is also of concern that the use of FLNG technology to process large gas reserves is unproven.
- 1.97 While there has been heavy investment into FLNG technology development, design assessment and scale testing are very different from actual deployment in challenging marine environments and confined space operations. During this Inquiry the Committee received evidence in relation to the safety of FLNG facilities. This matter is not within the scope of this Inquiry, but the Committee intends to undertake further investigation of the safety of FLNG technology.
- 1.98 The use of FLNG technology to process gas offshore also has significant implications for State revenues, and for the supply of domestic gas for Western Australian consumers.
- 1.99 The Committee is also aware that there may be opportunities for Western Australian local providers, particularly in the skills development and servicing sectors. While these aspects of the impact of FLNG are explored in this report, the Committee intends to produce a further report that will outline in more detail some of the opportunities it sees arising from the use of FLNG technology in the region.
- 1.100 It is in this climate, and in recognition of the importance of the issue, both locally and nationally, that the Committee resolved that its first Inquiry would be into the economic implications of FLNG for Western Australia.

Structure of the report

- 1.101 This report is presented in two volumes. Volume 1 begins with an introduction to the Inquiry and provides a general overview of the oil and gas industry in Western Australia.
- 1.102 As the issue of local content provided the impetus for the Inquiry, Volume 1 also contains a discussion of government local content policies. Following this, the balance of Volume 1 addresses the issues at the heart of the Inquiry, namely the economic impact of FLNG on three particular sectors of the Western Australian economy: the engineering and design; fabrication and manufacturing; and construction and ancillary services. The impact of FLNG on State revenue and on domestic gas is also addressed in Volume 1.
- 1.103 While overall volume 1 indicates that FLNG will have a negative impact on certain sectors of Western Australian industry, the Committee heard evidence of certain opportunities that might arise from FLNG technology. Therefore, while noting that the Committee intends to undertake further work on this issue, Volume 1 also contains a

brief discussion of research and workforce opportunities that might arise from the use of FLNG technology to develop gas reserves off the coast of Western Australia.

1.104 Volume 2 provides important contextual information to support Volume 1 of the report. It provides further background information on the oil and gas industry, the history of the industry in Western Australia and the global market for oil and gas. It also focuses on the evidence provided to the Committee on why companies have signalled FLNG to be their concept of choice for the development of gas fields off the Western Australian coast.

Chapter 2

Public administration of Australian offshore oil and gas activities

Like the onshore petroleum regulatory regime, this [Commonwealth] offshore legislative framework aims to provide an orderly exploration and production of petroleum resources and sets out the rights, entitlements and responsibilities of government and industry.

Ms Fiona Melville and Mr Clive Cachia, K&L Gates⁸¹

Introduction

- 2.1 This chapter begins with a brief overview of the history of the regulation of oil and gas activities off the Western Australian coast. This includes the development of the Offshore Constitutional Settlement, the establishment of a Designated Authority and the evolution of the current national-level regulatory authority, the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) and the National Offshore Petroleum Titles Administrator (NOPTA).
- 2.2 Noting that a very small proportion of offshore petroleum resources fall under the exclusive jurisdiction of Western Australia (WA), the chapter provides an overview of the current regulatory framework. Part of this framework includes provisions for government decision-making in relation to retention leases, and the former Commonwealth minister's unilateral decision to agree to a lease variation for the Browse field is also outlined.
- 2.3 The chapter concludes with a brief note on the regulation of petroleum production through royalties and domestic gas reservation obligations in WA.

History of the regulation of offshore oil and gas activities

- 2.4 In Australia, the oil and gas sector is affected by a number of federal and state laws and policies. The submission of the Department of Mines and Petroleum (DMP) provides a useful overview of the history of the regulation of offshore petroleum exploration and production in Australia. According to the DMP:

[p]rior to 1970, both the state government and the Commonwealth claimed regulatory responsibility for offshore areas, leading to

81 Melville, Fiona and Cachia, Clive, *Australia's capital challenge and the role of gas—Energy White Paper 2012 highlights*, K&L Gates, 13 November 2012, pp 2–3.

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examples where both authorities issued titles in those areas. This state of affairs persisted until the High Court of Australia determination in 1975 [New South Wales v Commonwealth [1975] HCA 58; (1975) 135 CLR 337 (17 December 1975)] which found that the Commonwealth had sovereignty rights in Australian territorial seas.

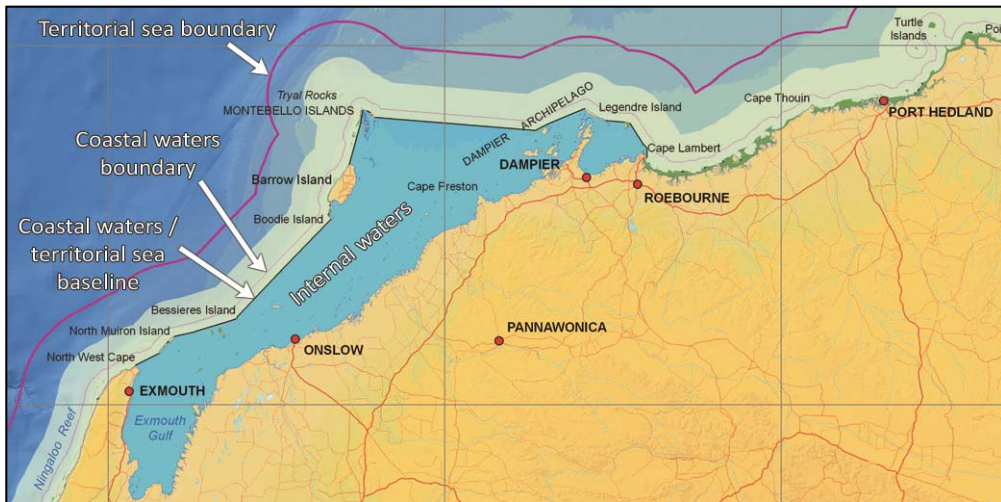
Following this decision, the Commonwealth and the states undertook negotiations resulting in the 'Offshore Constitutional Settlement' [Constitutional Powers (Coastal Waters) Act 1980] in 1980, which deals with Commonwealth and state jurisdiction in the waters to the edge of the territorial sea. The settlement also includes arrangements on managing oil, gas and other seabed minerals, the Great Barrier Reef Marine Park, other marine parks, historic shipwrecks, shipping, marine pollution and fishing. In general, the states have responsibility for areas up to three nautical miles from the territorial sea baseline, which are termed 'coastal waters'.⁸²

2.5 There is an exception to the general 'three nautical miles' rule. In certain places such as where areas of the coastline are deeply indented, the territorial sea baseline is generally extended, which creates larger expanses of coastal waters.⁸³ For example, in WA, although Barrow Island is located some 50 kilometres off the Pilbara coast, because it is squarely between the northern tips of the Exmouth and Burrup Peninsulas it is entirely within Western Australian coastal waters. This is illustrated in Figure 2.1 below.

82 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 3.

83 Department of Industry, *Australia's offshore jurisdiction: Explanation of terminology in relation to petroleum exploration and development*, p 2. Available at: [http://www.innovation.gov.au/resource/Documents/upstream-petroleum/Australia+ per centC3 per centA5s_Offshore_Jurisdiction.pdf](http://www.innovation.gov.au/resource/Documents/upstream-petroleum/Australia+per+centC3+per+centA5s_Offshore_Jurisdiction.pdf). Accessed on 20 December 2013.

Figure 2.1: Map of coastal waters between the Exmouth and Burrup Peninsulas.⁸⁴



2.6 Following the implementation of the 1980 settlement, a Designated Authority was created. In conjunction with DMP (and its predecessors), this authority dealt with such matters as activity approvals and titles administration. A Joint Authority arrangement was implemented whereby high level decisions, including the granting of permits and the release of petroleum exploration acreage, are made by Commonwealth and state ministers.

2.7 In 2005 the Commonwealth Government created the National Offshore Petroleum Safety Authority (NOPSA) to manage and regulate the occupational health and safety of offshore activities. In 2012 NOPSA was replaced by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), replacing the functions of the Designated Authority. At the same time, NOPSA's role and name was expanded to include environment regulation in the new NOPSEMA.⁸⁵

Current regulatory framework

2.8 Petroleum resources are generally located beyond the coastal water boundary in the Commonwealth offshore area (referred to as the Exclusive Economic Zone or EEZ). Consequently, only a very small percentage of petroleum resources in offshore areas around Western Australia fall under the exclusive jurisdiction of the state government. The vast majority of Australia's offshore petroleum resources are governed by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGGS Act).

2.9 One of the primary objectives of the OPGGS Act is 'to provide an effective regulatory framework for petroleum exploration and recovery',⁸⁶ to promote the development of

84 Geoscience Australia, *Australia's Maritime Jurisdiction Map Series*. Available at: <http://www.ga.gov.au/marine/jurisdiction/map-series.html>. Accessed on 14 April 2014.

85 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, pp 4-5.

86 *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth).

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commercial discoveries of petroleum in Australia.⁸⁷ This is broadly achieved via the administration of Exploration Permits, retention leases and production licences.

2.10 Typically, a petroleum title will begin as an Exploration Permit which, if a viable discovery is made, will then progress to either a production licence or a retention lease. Retention Leases are determined by the Joint Authority before being granted by NOPTA under s 142 of the OPGGS Act, and provide lessees with secure title over petroleum resources that have genuine development potential, but are not currently commercially viable.⁸⁸

2.11 Retention Leases are granted for a period of five years. At the expiry of this (and any subsequent) period, the lessee may apply, under s 154 of the OPGGS Act, for the lease to be renewed for a further five year period. In support of an initial application for a Retention Lease, the lessee must demonstrate that the recovery of petroleum from the area in question is not currently commercially viable, but is likely to become commercially viable within 15 years. This same test must be satisfied each time the lessee seeks to have a Retention Lease renewed.

2.12 Under s 155(3) of the OPGGS Act, if the recovery of petroleum from a retention lease area becomes commercially viable, it must be developed, and the Joint Authority must refuse any application to renew the retention lease. In effect, s 155(3) of the OPGGS Act is a 'use it or lose it' provision.

2.13 In October 2013, law firm Clayton Utz noted that:

*commercial viability means that the discovery could be developed given existing knowledge of the field, having regard to prevailing market conditions and using proven technology readily available within the industry so as to provide an acceptable rate of return.*⁸⁹

2.14 In considering the application of the 'commercial viability' requirement within the OPGGS Act, Clayton Utz concluded that s 155(3) has never been strictly applied 'as

87 O'Sullivan, Kevin and Wiese, Peter, Clayton Utz, *Greater scrutiny of offshore retention leases under proposed "use it or lose it" policy*, 10 October 2013, Available at: http://www.claytonutz.com/publications/edition/10_october_2013/20131010/greater_scrutiny_of_offshore_retention_leases_under_proposed_use_it_or_lose_it_policy.page. Accessed on 19 December 2013.

88 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 5.

89 O'Sullivan, Kevin and Wiese, Peter, Clayton Utz, *Greater scrutiny of offshore retention leases under proposed "use it or lose it" policy*, 10 October 2013, Available at: http://www.claytonutz.com/publications/edition/10_october_2013/20131010/greater_scrutiny_of_offshore_retention_leases_under_proposed_use_it_or_lose_it_policy.page. Accessed on 19 December 2013.

Retention Leases are commonly renewed despite the presence of commercially viable petroleum reserves.⁹⁰

2.15 The Economics and Industry Standing Committee of the 38th Parliament considered strong arguments either in favour or critical of these retention lease arrangements. That Committee concluded that ‘the current process underpinning the application for and renewal of retention leases lacks sufficient vigour and enables the stockpiling of gas reserves by incumbent producers.’⁹¹ Consequently, that Committee made a recommendation that the DMP request the Commonwealth government review its reservation lease policies.

2.16 Clayton Utz also notes that the current retention lease arrangements may change under the current Coalition Government, which was elected in September 2013. The federal government has announced that it ‘intends to verify that Retention Leases granted under the [OPGGs Act] are being held for “a legitimate need to secure gas for long-lived production projects” and not to “obtain a competitive commercial advantage.”’⁹² The Committee welcomes this development, but suggests that the federal government needs to specify the criteria for assessing adherence to Retention Lease obligations.

Recommendation 2

The Minister for Mines and Petroleum and the Minister for State Development urge the Commonwealth Government to specify the criteria for assessing that Retention Leases granted under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) are held for a legitimate need to secure gas for long-lived production projects and not to obtain a competitive commercial advantage.

2.17 A commitment to exploration is a condition of all Exploration Permits. Typically this requires lessees to conduct seismic surveys and drill explorations wells. Conditions, such as the need to conduct regular commerciality tests and field appraisal activities, are also imposed by retention leases. In its submission to this Inquiry, the DMP noted that:

when considering commitment obligations particularly as they relate to retention lease conditions and FDP’s [Field Development Plans], WA and the Commonwealth have often taken divergent views. WA

90 *ibid.*

91 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Western Australia, 24 March 2011, p 109.

92 O’Sullivan, Kevin and Wiese, Peter, Clayton Utz, *Greater scrutiny of offshore retention leases under proposed “use it or lose it” policy*, 10 October 2013, Available at: http://www.claytonutz.com/publications/edition/10_october_2013/20131010/greater_scrutiny_of_offshore_retention_leases_under_proposed_use_it_or_lose_it_policy.page. Accessed on 19 December 2013.

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*considers that a company's commercial drivers may not be congruent with the overall interests [of] the people of Western Australia. WA considers that commerciality tests must also consider the interests of the state and be vigorously tested and validated.*⁹³

2.18 As previously mentioned, the Commonwealth tends to believe that industry knows best how to develop resources and that as it is in the companies' best interest to maximise return on investment, their proposals will align with government objectives. Western Australia has tended to not accept this concept of alignment of interests and endeavours to make more robust assessments. This difference in approach often results in conflicts of view within Joint Authority decision-making processes. When there are not only differences in view between the Commonwealth and Western Australia as well as differences in view with the companies involved, decisions can become protracted.

2.19 This situation occurred, for example, for a Retention Lease renewal application for a small oil and gas field in the North West Shelf Joint Venture area, the Egret Field. This is one of several oil or gas fields in the area held by the North West Shelf Joint Venture. The original Retention Lease was granted in December 1995 and renewed in July 2002. The joint venture applied for a second renewal in May 2007. After more than a year of assessment and evaluation, in July 2008 the Joint Authority refused the application on the grounds that the Egret field was commercially viable. The Retention Lease remained in place until production licences were granted. The Joint Venture applied for Production Licences in July 2009 and these were granted in February 2013. DMP advised that since January 2012 considerable discussion was held between NOPTA, the Joint Authority delegates and Woodside, the operator of the production licences. DMP's major concern is that not only was the field thought to be commercially viable, but the oil resource was being lost through aquifer depletion and gas cap expansion. Ultimately, this will lead to less resource recovery. Three years on, the field is still held by the Joint Venture and is not yet in production. There have been several other instances where this situation occurred, the most recent of which relates to the granting of approval to vary Retention Leases for the Browse fields.⁹⁴

2.20 The development of FLNG technology has clear implications for the granting of Retention Leases and renewals, particularly in relation to the requirement that development is not commercially viable at the time of application. Evidence from proponents of FLNG suggests that it is a technology that can be adapted to almost any gas resource and has a considerably lower capital cost. Notwithstanding that Retention Leases are also subject to conditions relating to the environment, safety and resource

93 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 5. A FDP must be submitted and approved by the DMP before an application to convert a Retention Lease into a production license will be granted.

94 Ms Beverley Bower, Department of Mines and Petroleum, Electronic mail, 11 April 2014.

recovery, if proponents are correct, FLNG must significantly change the commercial viability landscape and the assumptions on which commerciality tests to date have been based. Following on from this, more detailed review and assessment of Retention Lease applications will be required. It is the Committee's view that the OPGGS Act should be reviewed to reflect the need for more robust assessment of commercial viability and, as more thorough assessment of applications will be required, appropriate staff resources should be made available.

Finding 5

The development of FLNG technology has clear implications for the granting of Retention Leases and renewals, particularly in relation to the requirement that development is not commercially viable at the time of application.

Recommendation 3

The Western Australian Government urge the Commonwealth Government to review the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) to reflect the need for more robust assessment of commercial viability, and as more thorough assessment of applications will be required, appropriate staff resources should be made available.

- 2.21 The Commonwealth Government's policy position encourages development of discovered petroleum resources. This development generates economic benefits, predominantly to the Commonwealth, including receipts of the Petroleum Resource Rent Tax (PRRT).⁹⁵
- 2.22 The PRRT is the principal tax on Australia's offshore petroleum industry and is applied at a rate of 40 per cent to a project's taxable profit.⁹⁶ The DMP describes the PRRT as 'a profit based project tax.'⁹⁷ PRRT is a complex form of cash flow taxation: it aims to tax only above-normal profits ('resource rent') without affecting investment decisions.⁹⁸ The DMP notes that 'exploration expenditures that are not deducted in the tax year in which they are incurred can be uplifted and carried forward to be used as deductions in subsequent years,' and that 'all project expenditures and payments of PRRT are tax deductible.'⁹⁹ In effect, the PRRT is the Commonwealth's method of compensating all Australian citizens for the sale of their property rights in the country's petroleum resources. As such, the PRRT receipts from any given offshore project represent the price at which the resource in question is sold to the relevant production company.

95 ABC News, *New Industry Minister Ian MacFarlane warns miners to start projects or lose leases*, 18 September 2013. Available at: <http://www.abc.net.au/news/2013-09-18/macfarlane-warns-miners-to-use-it-or-lose-it/4966250>. Accessed on 20 December 2013.

96 Profit being defined as project income less project expenditure. Project expenditure includes project exploration expenditure and exploration expenditure transferred in from other related projects.

97 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

98 Mayo, Wayne, *Taxing resource rent*, Kyscope Publishing, Victoria, 2013, p 6.

99 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

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- 2.23 The use of the PRRT as the federal government's sole method for compensating Australian citizens for the sale of the country's petroleum resources follows the longstanding policy position of the federal government to not interfere with commercial decisions made by investors. The logic informing the use of the PRRT is that investors, whose own money is on the line, are the people who are best equipped to make decisions as to the optimal development method for petroleum projects.

In the best interests of...?

- 2.24 As noted above, most of Australia's petroleum resources are governed by the OPGGS Act. For each offshore area, s 56 of that Act establishes a Joint Authority comprised of the responsible state or Northern Territory Minister and the responsible Commonwealth Minister.¹⁰⁰

- 2.25 According to NOPTA's website, it is the responsibility of Joint Authorities to:

*make the major decisions under the Offshore Petroleum Greenhouse Gas Storage Act 2006 (OPGGS Act) concerning the granting of petroleum titles, the imposition of title conditions and the cancelling of titles, as well as core decisions about resource management and resource security.*¹⁰¹

- 2.26 NOPTA lists the Joint Authority's key functions and powers as:

- *the release of offshore petroleum exploration areas*
- *assessment of industry bids for these areas*
- *granting (or refusal) and renewal of offshore petroleum titles*
- *variation of title conditions*
- *suspension and extension to title terms*
- *cancellation of titles.*¹⁰²

- 2.27 Under s 66 of the OPGGS Act a Joint Authority may delegate its functions or powers to two persons, one to represent each party.¹⁰³

- 2.28 To assist Joint Authorities achieve 'a uniform and consistent approach,' the Department of Resources, Energy and Tourism developed *Guidelines for offshore petroleum Joint*

100 The responsible Commonwealth minister is the Joint Authority for the offshore area of Tasmania and for the offshore areas of individual external Territories. See s 56(2A) and s 56(8). Ministers are able to delegate their authority.

101 National Offshore Titles Administrator, *Joint Authority*. Available at: http://www.nopta.gov.au/joint_authority.html. Accessed on 18 February 2014.

102 National Offshore Titles Administrator, *Joint Authority*. Available at: http://www.nopta.gov.au/joint_authority.html. Accessed on 18 February 2014.

103 This applies to the Northern Territory all states except Tasmania.

Authority decision-making procedures (the JA Guidelines).¹⁰⁴ These guidelines set out the procedures for the assessment of applications, consultation with stakeholders, consideration of NOPTA reports, decision-making and press releases.

- 2.29 Under the JA Guidelines, NOPTA, on behalf of the Joint Authorities, receives and assesses all applications relating to offshore titles. Following assessment of an application, which will involve consultation with stakeholders, NOPTA provides a report to the responsible Joint Authority via the relevant government departments. The JA Guidelines provide that departments be given ‘reasonable opportunity to consider NOPTA advice’ and that such consideration ‘should take no more than two weeks for complex decisions and one week for simple decisions.’¹⁰⁵
- 2.30 The OPGGS Act also provides for circumstances where there is disagreement between the parties to a Joint Authority. Section 59(2) states that where the Commonwealth and state ministers disagree about a decision, the Commonwealth minister ‘may decide the matter’ and that decision ‘has effect as the Joint Authority Decision.’ Section 59(3) provides that where the responsible Commonwealth minister gives the state minister notice of a decision that he or she thinks should be made and the State does not respond within 30 days, the Commonwealth minister may decide the matter.

The Commonwealth’s unilateral decision on Browse retention leases

- 2.31 For the Western Australian offshore area the Joint Authority is the Commonwealth–Western Australia Offshore Petroleum Joint Authority.¹⁰⁶ It is this Joint Authority that is responsible for, amongst other things, varying title conditions, suspending or extending title terms or cancelling titles in relation to gas fields off the Western Australian coast, including those held by the Woodside for the Browse fields.
- 2.32 The five Commonwealth Browse Basin Retention Leases held by the Browse Joint Venture are WA-28-R, WA-29-R, WA-30-R, WA-31-R and WA-32-R. The Joint Venture’s Western Australian Browse Basin retention leases are TR/5(R1) and R2(R1). A map of these petroleum titles, as well as the Brecknock, Calliance and Torosa gas fields to which they pertain, is included at Appendix Eleven.
- 2.33 On 7 June 2013 NOPTA received an application to vary the five Commonwealth Retention leases for the Browse fields.¹⁰⁷ On the same day, DMP received an application to vary the two state leases. In line with the JA Guidelines ‘and the established working arrangements between the delegates of the Joint Authority members’ and NOPTA, DMP was also provided with copies of the Commonwealth lease

104 Department of Resources, Energy and Tourism, *Guidelines for offshore petroleum Joint Authority decision-making procedures*, Commonwealth of Australia, January 2012, p 1.

105 *ibid*, cl 2.5–2.8.

106 Section 56(2)(b) *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth).

107 Submission No. 52 from Department of Mines and Petroleum, 28 February 2014, p 5.

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variation application.¹⁰⁸ The Executive Director of DMP ‘sought clarification particularly in regard to the commerciality of the LNG project and resource estimates’ from NOPTA.¹⁰⁹ Additionally, clarification was also sought from Woodside by DMP as part of its independent assessment of the application for variation to the state titles.¹¹⁰

2.34 Woodside responded to NOPTA and DMP requests for further information on 21 June and 24 June 2013, providing a reserves report, information on hydrocarbon resources within the Retention Leases and clarification of the indicative expenditure.¹¹¹

2.35 On 27 June Hon Gary Gray, MP, then Commonwealth Minister for Resources and Energy, wrote to Hon Bill Marmion MLA, WA Minister for Mines and Petroleum, advising that NOPTA’s assessment was that the Browse Joint Venture ‘has demonstrated that the James Price Point development option is not commercially viable and that the Joint Venture’s application for variation of the Browse retention leases should be approved.’¹¹² Minister Gray also advised the Western Australian minister that, having reviewed NOPTA’s advice and the Joint Venture’s application, he ‘consider[ed] that no further information is required in order for a decision to be made by the Joint Authority.’¹¹³ Additionally, the Commonwealth minister stated that he was ‘committed to the early and successful commercialisation of the Browse resources’ and wished ‘to see this matter resolved as soon as possible.’¹¹⁴ Given this, he advised that he thought NOPTA’s advice should be accepted and, in accordance with the OPGGS Act, Minister Marmion had 30 days in which to provide his view. If the State’s view was not received within this timeframe, the Minister stated, in accordance with the OPGGS Act, ‘I will decide the matter.’¹¹⁵ Furthermore, should the Joint Authority parties disagree on the decision to be made, the Commonwealth Minister also stated that his decision ‘as responsible Commonwealth Minister will prevail.’¹¹⁶

2.36 On 28 June DMP requested additional clarification from NOPTA in relation to the Commonwealth Retention Leases and to Woodside in relation to the WA leases.¹¹⁷ DMP advised that Woodside provided some information on 16 July 2013, but the Department ‘still had questions regarding the proposed work to further clarify reserves and assess several development options.’¹¹⁸

108 *ibid.*

109 *ibid.*

110 *ibid.*

111 Submission No. 54 from Department of Mines and Petroleum, 28 February 2014, p 2.

112 Hon Gary Gray, AO MP, Minister for Resources and Energy, Letter to Hon Bill Marmion, MLA, 27 June 2013.

113 *ibid.*

114 *ibid.*

115 *ibid.*

116 *ibid.*

117 Submission No. 54 from Department of Mines and Petroleum, 28 February 2014, p 2.

118 *ibid.*

2.37 DMP submitted that:

*on 26 July, the Western Australia Joint Authority member advised the Commonwealth Joint Authority member that he was unable to confirm his position due to lack of clarity of how the proposed work program would provide additional understanding of the reserves estimates or life of field resource management.*¹¹⁹

2.38 DMP considers that the Commonwealth Minister's letter of 27 June 2013 'did not provide sufficient time for Minister Marmion to be briefed on NOPTA's 24 June 2013 advice.'¹²⁰

2.39 On 2 August 2013, nevertheless, a variation to the Commonwealth leases was approved by Hon Gary Gray, MP. On the same day, NOPTA advised DMP that Minister Gray had made his decision and had written to the state minister notifying him of his reasons for that decision.¹²¹ A copy of the Commonwealth minister's letter is provided at Appendix Twelve.

2.40 This variation waived the requirement that the gas be processed 'at the Kimberley LNG precinct,' and, thus, allowed 'the Browse Joint Venture participants to progress the selection of an alternative development concept and commence related design and engineering work.'¹²² In effect, this permitted Woodside Petroleum, as operator of the Browse project, to begin active consideration of FLNG as a development option. In September 2013 the Browse joint venture partners announced that Basis of Design (BOD) work on a concept using Shell's FLNG technology had been initiated. It is expected that the project will move into the Front-End Engineering and Design (FEED) phase by 2014, with final investment decision (FID) due in 2015.

2.41 DMP advised that 'while all decision making processes were in accordance with the OPGGS Act 2006 the unilateral decision by the Commonwealth Joint Authority member is unprecedented.'¹²³

2.42 In order to determine its position on the applications to vary the retention leases, DMP would undertake its own analysis based on the information presented by Woodside. NOPTA did not make its assessment details available to DMP. In these circumstances, the two weeks allowed in the JA Guidelines is insufficient for Joint Authority parties

119 Submission No. 52 from Department of Mines and Petroleum, 28 February 2014, p 5.

120 Submission No. 54 from Department of Mines and Petroleum, 28 February 2014, p 3.

121 Submission No. 52 from Department of Mines and Petroleum, 28 February 2014, p 5.

122 *Variation to Commonwealth Browse Retention Leases Approved*, Media Statement, Woodside Petroleum, 2 August 2013. Available at: <http://www.woodside.com.au/Investors-Media/Announcements/Documents/02.08.2013%20Variation%20to%20Commonwealth%20Browse%20Retention%20Leases%20Approved.pdf>. Accessed on 22 November 2013.

123 Submission No. 52 from Department of Mines and Petroleum, 28 February 2014, p 5.

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and/or their delegates to make such complex decisions, and erodes the ability of states and territories to effectively participate in the process.

2.43 The Committee is not convinced that all provisions of the JA Guidelines were adhered to. Clause 2.6 of the JA Guidelines states that ‘Departments will have the opportunity to seek clarification or additional information from NOPTA.’¹²⁴ The Executive Director of DMP sought clarification from NOPTA and from Woodside. No clarification was received from NOPTA. In effect, this meant that DMP was not in a position to assess the Retention Lease variation applications and be adequately involved in the decision-making processes as outlined in the JA Guidelines. DMP was also not in a position to advise the WA Minister, effectively excluding WA from the decision-making. For example, because the clarification sought by DMP was not received, the WA delegate was not in a position to make known the State’s agreement or otherwise with the NOPTA assessment. In turn, this meant that clause 2.10, which states that ‘if delegates are unable to agree on a matter requiring decision, they must refer the matter to the JA’ could not come into effect.

2.44 Additionally, at the time the original leases were granted, there was an agreement between the Joint Authority delegates that ‘where possible the State and Commonwealth retention leases would be progressed together.’¹²⁵ This agreement is evident in that the 2008–2009 and the 2012 variations were ‘progressed together with the same conditions for State and Commonwealth RL’s [Retention Leases].’¹²⁶

2.45 The federal government’s unprecedented and unilateral decision, made without fair and reasonable consideration of WA’s position, may be in the best interests of the Commonwealth, but—as the rest of this report makes clear—is not in the best interests of Western Australia.

Finding 6

The Commonwealth Government’s 2013 decision to approve variations to the Commonwealth Browse gas field Retention Leases:

- removed from the Commonwealth leases the requirement for the Browse Joint Venture to develop James Price Point; and
- allowed the Browse Joint Venture to consider other development concepts, including FLNG.

124 Department of Resources, Energy and Tourism, *Guidelines for offshore petroleum Joint Authority decision-making procedures*, Commonwealth of Australia, January 2012, cl 2.6.

125 Submission No. 54 from Department of Mines and Petroleum, 28 February 2014, p 2.

126 Submission No. 55 from Department of Mines and Petroleum, 28 February 2014, p 2.

Finding 7

The process by which the Commonwealth Government approved the variations to the Commonwealth Browse gas field Retention Leases did not follow established working arrangements.

Finding 8

In solely relying on information, analysis and conclusions provided by project proponents to assess Retention Lease applications, the Commonwealth Government is abrogating its responsibility as a decision-maker on behalf of Australian citizens.

Finding 9

The Commonwealth Government's 2013 unilateral decision to approve variations to the Commonwealth Browse gas field Retention Leases is unprecedented and was made without fair and reasonable consideration of Western Australia's position on the leases and the impact on the development of the Retention Leases for State titles.

Finding 10

The Commonwealth Government's 2013 approval of variations to the Commonwealth Browse gas field Retention Leases does not amend the leases for State titles.

Finding 11

The Western Australian Government is yet to complete its assessment of the applications to vary the Browse gas field leases for State titles.

Recommendation 4

The Minister for State Development takes whatever action is appropriate to ensure the Commonwealth Government complies not only with the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) and the Joint Authority Guidelines, but with the established working arrangements between Joint Authority members. This may include, but not be limited to:

- referring the matter to the Ministerial Council;
- developing changes to the Joint Authority Guidelines so that they better reflect established working arrangements; and/or
- seeking legal advice as to the lawfulness of the Commonwealth Minister's unilateral decision relating to the Browse Retention Leases.

Finding 12

Unilateral Commonwealth decisions relating to petroleum Retention Leases potentially have a major negative impact on the Western Australian economy.

Finding 13

The current Joint Authority provisions in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) put at risk the fundamental basis for which Joint Authorities were established.

Recommendation 5

Given the unilateral decision made on the Commonwealth Browse Retention Leases, and the risk this poses for Western Australia, the Minister for Mines and Petroleum takes the necessary steps to effect the amendment of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) to ensure greater transparency of, and adequate consultation time in, the Joint Authority process.

Western Australia's royalties

2.46 In WA, a royalty payment is levied on any petroleum production where the wellheads are located either onshore or within coastal waters. Royalties are also levied on the North West Shelf Project. In 2011, total petroleum royalties collected amounted to \$949 million—an amount that represented approximately 18 per cent of all royalties collected in WA that year. According to the DMP, 'the rate of the royalty is normally set at between 10 and 12.5 per cent of the wellhead value of petroleum produced.'¹²⁷ The issue of royalties is discussed in more detail in Chapter 9 of this Volume.

Western Australia's domestic reservation obligations

2.47 In addition to levying a royalty on petroleum production from wellheads in state territory, since 2006 the WA Government has maintained a formal 'Policy on Securing Domestic Gas Supplies,' (the Reservation Policy) in relation to gas export projects. Under this policy, proponents of gas export projects are required to reserve up to 15 per cent of LNG production for supply to the domestic market at commercial rates. This commitment to supply gas into the domestic market is a condition for access to land required for gas processing and LNG production facilities.

2.48 Prior to the introduction of the Reservation Policy, the government used State Agreements—contracts ratified by an Act of Parliament—to impose domestic gas obligations on the Gorgon LNG project and the North West Shelf project. Since the Reservation Policy was adopted, there have been two LNG export projects that have been subjected to the Reservation Policy: Woodside's Pluto project and Chevron's Wheatstone project.

2.49 In both cases, project proponents have agreed to supply an amount of gas to the domestic market that is in line with the 15 per cent Reservation Policy requirement. Specifically, Woodside has agreed to supply the equivalent of 15 per cent of LNG

127 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 7.

production as domestic gas within five years of the first Pluto LNG shipment, or after the 30 millionth tonne of LNG has been exported (the first shipment departed the Pluto facility on 12 May 2012).¹²⁸ With respect to the Wheatstone project, Chevron is building a domestic gas processing plant on the Wheatstone site with the capacity to produce and supply 200 TJ of gas per day—an amount that would be slightly more than the required 15 per cent—into the domestic market from the day that the LNG facility begins production in 2016.¹²⁹

2.50

Extensive commentary and analysis of the Reservation Policy is contained within the 2011 *Inquiry into domestic gas prices* report. In that report, strong support was expressed for the Reservation Policy. The issue of the Reservation Policy and domestic gas production is returned to in Chapter 8.

128 Tanquintic-Misa, Esther, 'Japan receives first 70,000 mt cargo from Australian Pluto LNG Project,' *International Business Times*, 22 May 2012. Available at: <http://au.ibtimes.com/articles/343652/20120522/lng-pluto-woodside-japan.htm#.UrKWadiW040>. Accessed on 18 December 2013.

129 DomGas Alliance, *Gas users welcome Wheatstone commitment*, 26 September 2011. Available at: [http://www.domgas.com.au/pdf/Media_releases/2011/Media per cent20release per cent20-per cent20Wheatstone per cent20Project-26-9-11.pdf](http://www.domgas.com.au/pdf/Media_releases/2011/Media%20release%20-%20Wheatstone%20Project-26-9-11.pdf). Accessed on 18 December 2013.

Chapter 3

Local content policy

Significant benefits are derived for the economy and for Australian people from Australian industry participation in investment projects, both domestically and abroad... The economic significance of Australian industry participation extends beyond the direct participants in investment projects to the industries and workers involved in a wide range of activities across Australia through industry linkages.

Australian Industry Participation National Framework¹³⁰

Introduction

3.1 The participation of Australian industry in investment projects, both in Australia and overseas, generates many direct and indirect benefits to the domestic economy. These include:

- *wealth and employment creation,*
- *increased standards of living,*
- *the stimulation and introduction of new and improved technologies (which in turn stimulate economic growth),*
- *skills enhancement,*
- *new opportunities for partnerships in global supply chains and the formation of other strategic alliances which aid technology transfer, innovation and market access.*¹³¹

3.2 The Australian Petroleum Production and Exploration Association Limited (APPEA) submitted that ‘industry already recognises the many benefits provided by local suppliers,’ including ‘faster turnaround of services, localised employment, improved timings and improved communications.’¹³²

3.3 In a submission to the Australian Industry Participation (AIP) Working Group established in 2011, the Australian Steel Institute (ASI) stated that ‘increased local content is good for Australia and the local economies in which the companies

130 Department of Industry, *Australian Industry Participation National Framework*, Commonwealth of Australia, Canberra, April 2001, p 2.

131 *ibid.*

132 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 23.

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operate.’¹³³ Citing an Industry Capability Network (ICN) report, ASI advised the Working Group that:

*for every \$1 million that is new or retained manufacturing business for Australia, the following effects flow through the economy: \$713,400 worth of gross value added (GVA) generated, 6 full-time equivalent jobs created, \$64,900 worth of welfare expenditure saved, and \$225,300 worth of tax revenue generated.*¹³⁴

3.4 While these flow-on effects ratios could not be precisely applied to the manufacturing business generated by the gas export industry, they do signal that the economic impact of local content, including for liquefied natural gas (LNG) projects, is substantial.

3.5 A key reason for local content policies is to put Australian businesses on equal footing with their international competitors that benefit from such policies and legislation implemented by their governments. An example of foreign legislation that constricts international free trade is the United States of America (US) *Merchant Marine Act of 1920* (USA), which regulates maritime commerce in US waters and between US ports. Section 27 of that Act requires all goods transported by water between US ports to be carried on US flagged ships which have been constructed in the US, are owned by US citizens and are crewed by US citizens and/or permanent residents.¹³⁵

3.6 Therefore, s 27 of the *Merchant Marine Act of 1920* (USA) functions to protect US shipbuilders against foreign competition within the domestic market. This means that Australian shipbuilders, for example, are legally prohibited from competing in the US domestic shipping market. This also means that they are unable to benefit from the economies of scale that access to this market may provide. The local content policies of some foreign nations are outlined at the end of this chapter.

3.7 Governments also protect their local industry through the provision of subsidies and other kinds of targeted assistance. For example, the Chinese government has heavily subsidised its industry to achieve strategic goals and help economic restructuring.¹³⁶ The scale of Chinese government subsidies is difficult to measure. A study of four key Chinese manufacturing industries estimated that subsidies between 2000 and 2007

133 Explanatory Memorandum, *Australian Jobs Bill 2013*, (Cth), p 16. The AIP Working Group was an initiative of the then Prime Minister, Hon Julia Gillard, MP, to advise on how new measures relating to the Australian Industry Participation Plans could be implemented.

134 Explanatory Memorandum, *Australian Jobs Bill 2013*, (Cth), p 16.

135 *Merchant Marine Act of 1920* (U.S.A.), s 27. This example was brought to the Committee’s attention by Mr John O’Hare, General Manager, Marine & Defence, Oil & Gas, Australian Marine Complex, Department of Commerce, during a site visit to the AMC.

136 *The Oxford Analytica Daily Brief*, September 30 2013. Available at: <http://www.oxan.com/analysis/dailybrief/samples/ChinaWTO.aspx>. Accessed on 1 April 2014; and Haley, Usha C V and Haley, George T, *Subsidies to Chinese industry. State capitalism, Business strategy, and trade Policy*, Oxford United Press, 2013.

‘appear in dollar terms to exceed over thirty per cent of industrial output.’¹³⁷ Another study found that Chinese government support of State owned enterprises between 2001 and 2009 was worth approximately 6.7 trillion renminbi (1.1 trillion dollars).¹³⁸

- 3.8 In relation to Australia’s cost competitiveness, the Committee was advised that the reason why China is cheaper is that ‘its currency is undervalued by 40 per cent, and it has a 50 per cent rebate on steel, and that is what we are competing against.’¹³⁹
- 3.9 Both the Commonwealth and Western Australian Governments have policies and initiatives relating to local content in major investment projects such as LNG developments. Generally speaking, the purpose of these is to maximise domestic industry participation in projects by, first, providing opportunities for Australian companies to win work, and second, encouraging linkages between local content providers and project proponents.
- 3.10 Local content initiatives have also been developed by non-government organisations. For example, the Chamber of Commerce and Industry of Western Australia (Inc) (CCIWA) operates its ProjectConnect initiative that aims to increase the proportion of local content in investment projects.
- 3.11 This chapter outlines the major federal and state governments’ local content initiatives most relevant to this Inquiry and the legislation through which they are implemented. It also outlines CCIWA’s ProjectConnect. The aim of such policies and instruments, their effectiveness and the support given by project proponents, developers and operators are also discussed.
- 3.12 The federal mechanisms discussed are:
- the Australian Industry Participation National Framework;
 - the Australian Industry Participation Plans;
 - the *Australian Jobs Act 2013* (Cth); and
 - the Industry Capability Network (ICN).¹⁴⁰

137 Haley, Usha C V and Haley, George T, *Subsidies to Chinese industry. State capitalism, business strategy, and trade policy*, Oxford United Press, 2013.

138 *The Oxford Analytica Daily Brief*, September 30 2013. Available at: <http://www.oxan.com/analysis/dailybrief/samples/ChinaWTO.aspx>. Accessed on 1 April 2014.

139 Closed evidence, *Transcript of Hearing*, 30 October 2013, p 3.

140 This is not an exhaustive list of the federal policies and initiatives aiming to increase local content, but are the most relevant to this Inquiry. Others include: Supplier Advocates, Enhanced By-law Scheme, the Supplier Access to Major Projects program, and the Buy Australia Home and Abroad initiative. See: Department of Industry, Australian Industry Participation National Framework. Available at: <http://www.industry.gov.au/industry/AustralianIndustryParticipation/Pages/AustralianIndustryParticipationNationalFramework.aspx>. Accessed on 2 January 2014.

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- 3.13 The Western Australian local content initiatives discussed include those of the state government and the CCIWA, as follows:
- the Local Industry Participation Framework;
 - the Industry Capability Network of WA (ICNWA);
 - State Agreements; and
 - ProjectConnect.
- 3.14 While oil and gas companies argue that they support providing opportunities to local industry, this chapter also acknowledges that local content policies are not universally accepted as achieving their stated aim of developing local industry and providing employment opportunities in Australia.
- 3.15 These policies and instruments were largely developed prior to the use of floating LNG (FLNG) technology becoming a reality for the development of gas reserves in the Australian and Western Australian jurisdictions. This chapter raises the possibility that they are not relevant to FLNG developments or the best way to maximise Australian content on these projects.

Commonwealth local content policy

- 3.16 The following outlines the Commonwealth Government's local content initiatives that are most relevant to this Inquiry. As the report is concerned with WA local content, discussion of the ICN is contained in the section on the ICNWA.
- 3.17 The Australian Industry Participation National Framework (the AIP National Framework) was endorsed by all Australian Governments in April 2001.¹⁴¹ According to the AIP National Framework document, it was developed to:
- *promote, develop and maintain a sustainable competitive Australian industry capability by encouraging competitive Australian industry participation in investment projects; and*
 - *work cooperatively, to secure for Australia, a greater share of the economic activity and benefits associated with investment projects by continuing to promote Australia as a world class investment location, and its industry as a capable and competitive participant in domestic and international investment projects.*¹⁴²

141 Department of Industry, *Australian industry participation national framework*, 2001. Available at: <http://www.industry.gov.au/industry/AustralianIndustryParticipation/Pages/AustralianIndustryParticipationNationalFramework.aspx>. Accessed on 2 January 2014.

142 Department of Industry, *Australian industry participation national framework*, Commonwealth of Australia, Canberra, April 2001, p 2.

3.18 There are eight principles underpinning this framework:

1. Project proponents are encouraged to provide Australian industry with 'full, fair and reasonable opportunity to participate';
2. States and territories will not use their 'purchasing preference arrangements';
3. The 'needs and aspirations of regional communities' is recognised and Australian Governments 'have the flexibility to respond to regional issues within the Framework';
4. Governments are committed to competitive neutrality and will not use 'their legislative or fiscal powers to advantage their own businesses over the private sector';
5. Proponents 'are encouraged to consider Australian industry in terms of the value for money it offers over the life cycle of the project';
6. Transparency 'should inform all policy and commercial dealings' and governments' investment project policies and procedures should be 'clear and unambiguous';
7. A consistent policy environment is provided by ensuring 'timely and relevant' policy decisions, effective consultation, adequate lead times and minimum disruptions resulting from policy changes; and
8. Consistency with 'Australia's international obligations, including those under the World Trade Organisation.'¹⁴³

Australian Industry Participation Plans

3.19 The following four strategic approaches were developed to give effect to the AIP National Framework:

- *encouraging industry to meet world's best practice through capability building;*
- *early identification of opportunities for Australian industry participation, both domestically and overseas;*
- *promoting Australian capability and integrating industry into global supply chains; and*
- *enhancing project facilitation and Australian industry participation.*¹⁴⁴

143 Department of Industry, *Australian industry participation national framework*, Commonwealth of Australia, Canberra, April 2001, pp 3–4.

144 *ibid*, pp 5–6.

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- 3.20 Under the AIP National Framework's 'Enhancing Project Facilitation and Australian Industry Participation' strategy, project proponents were '*encouraged* to adopt Australian Industry Participation Plans (AIPPs).'¹⁴⁵
- 3.21 However, under the *Australian Jobs Act 2013* (Cth), which commenced on 27 December 2013, proponents of 'major projects in Australia with a capital expenditure of \$500 million or more are *required* to prepare and implement' an AIPP.¹⁴⁶ The *Australian Jobs Act 2013* (Cth) will be discussed in more detail below.
- 3.22 An AIPP is a project-specific document that sets out what actions a proponent will take and what strategies will be in place to 'provide Australian industry with *full, fair and reasonable opportunity* to participate in the organisation's project.'¹⁴⁷ The AIPP must address a number of criteria, including, but not limited to, the 'expected areas of opportunity for Australian suppliers, and an estimate of the percentage of Australian industry value added for the project'; the organisation's communication strategy for the early identification of opportunities; and strategies for local content:
- through the entire supply chain;
 - for all stages of the project;
 - for longer-term participation; and
 - for encouraging 'local capability development and integration into global supply chains.'¹⁴⁸
- 3.23 AIPPs also provide proponents with:
- an opportunity to familiarise itself with Australian capability, identify qualified suppliers and to secure valuable support for the project from industry, local communities and governments.*¹⁴⁹
- 3.24 While AIPPs are now mandatory for major investment projects, the AIP National Framework does not mandate the use of Australian industry. This is in keeping with Australia's international obligations.¹⁵⁰

145 Department of Industry, *Australian Industry Participation National Framework*, Commonwealth of Australia, Canberra, April 2001, pp 5–6. Emphasis added.

146 Department of Industry, *Australian Industry Participation Plans required by the Australian Jobs Act 2013*. Available at: <http://www.industry.gov.au/industry/AustralianIndustryParticipation/Pages/AIP-plans-required-Jobs-Act-2013.aspx>. Accessed on 2 January 2014. Emphasis added. An overview of the Australian Jobs Bill 2013 can be found in: Economics Legislation Committee, *Exposure Draft of the Australian Jobs Bill 2013*, The Senate, Commonwealth of Australia, May 2013.

147 Department of Industry, *Australian Industry Participation Plans. User Guide for Developing an AIP Plan*, Commonwealth of Australia, Canberra, p 6.

148 *ibid*, pp 12–23.

149 Department of Industry, *Australian Industry Participation National Framework*, Commonwealth of Australia, Canberra, April 2001, p 6.

3.25 Major oil and gas companies acknowledged the need to lodge AIPPs. For example, Shell advised the Committee that its AIPP:

*was approved by AusIndustry and the Industry Capability Network of Western Australia back in 2009. We set off with this early enough to try to make sure that we could get local companies onto the prequalification bid lists. If we do not get them on early, it makes it hard later on when the tendering starts happening.*¹⁵¹

3.26 INPEX advised that:

*discussion about local content and training and employment are important with all major oil and gas projects requiring industry participation plans that enshrine their commitment to local business engagement.*¹⁵²

3.27 INPEX further advised that it had:

*industry participation agreements both with the NT government and with the Australian government, and that includes a commitment to local content to ensure reasonable opportunities for Australian companies to win work, and Australian companies are winning work and Western Australian companies are winning work on the Ichthys project.*¹⁵³

3.28 For Woodside, completion of an AIPP demonstrates its continued participation in government initiatives ‘that aim to strengthen participation by Australian businesses in the construction and operations phases of the resource projects.’¹⁵⁴

3.29 At this point, it is useful to acknowledge that Division 2 of the *Australian Jobs Act 2013* (Cth) sets out the rules that apply to AIPPs, with ss 35–36 containing the proponent’s main obligations in achieving stipulated objectives. These include, but are not limited to:

- ensuring the procurement entity has a publicly accessible website (s 35(1)(b));
- not requesting bids for supply until the procurement entity has a broad understanding of Australian companies’ capacity and capabilities to supply (s 35(1)(c));

150 Department of Industry, *Australian Industry Participation Plans. User Guide for Developing an AIP Plan*, Commonwealth of Australia, Canberra, p 3 and p 6.

151 Mr Ian Grose, Commercial Manager–East Browse, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 7.

152 Submission No. 19 from INPEX, 30 August 2013, p 7.

153 Mr William Townsend, General Manager–External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 11.

154 Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 19.

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- publishing details of bidder requirements on the entity's website at a reasonable time before bid requests are made (s 35(1)(d))
- conducting awareness programs in relation to opportunities to supply (s 36(1)(b); and
- encouraging Australian suppliers to the project to develop the capability and capacity to supply to, and integrate into, the proponents global supply chain (s 36(1)(f)(i) and (ii)).

Full, fair and reasonable opportunity

3.30 The AIP National Framework also states that AIPPs 'enable proponents to demonstrate a commitment to the principle of full, fair and reasonable opportunity.'¹⁵⁵ The *User guide for developing an AIP plan* states that providing 'Australian industry, especially small and medium sized enterprises (SMEs), with full, fair and reasonable opportunity to participate in major investment projects, in Australia and overseas' is the 'key principle' of the AIP National Framework.¹⁵⁶

3.31 Shell acknowledges that 'providing full, fair and reasonable access' is the 'guiding principle' of AIPPs.¹⁵⁷ Chevron advised that 'the significant Australian industry participation' that its Gorgon and Wheatstone projects would deliver would be achieved 'by providing full, fair and reasonable opportunity for Australian businesses to supply goods and services.'¹⁵⁸

3.32 Each element of this concept is defined in the AIP National Framework as follows:

- **Full**—*Australian industry has the same opportunity afforded to other global supply chain partners to participate in all aspects of a project (e.g. design, engineering, project management, professional services and IT architecture).*
- **Fair**—*Australian industry is provided the same opportunity as global suppliers to compete on projects on an equal and transparent basis, including given reasonable time in which to tender.*

155 Department of Industry, *Australian industry participation national framework*, Commonwealth of Australia, Canberra, April 2001, p 6. The AIP National Framework details what an AIPP could include.

156 Department of Industry, *Australian industry participation plans. User guide for developing an AIP plan*, Commonwealth of Australia, Canberra, p 3.

157 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 13.

158 Mr Roy Krzywosinski, Managing Director, Chevron, *Transcript of Evidence*, 24 October 2013, p 3.

- **Reasonable**—*tenders are free from non-market burdens that might rule out Australian industry and are structured in such a way as to provide Australian industries the opportunity to participate in projects.*¹⁵⁹

3.33 The CCIWA submitted that it supports the AIP National Framework definition for full, fair and reasonable opportunity.¹⁶⁰

3.34 The Committee is not aware of any federal government assessment of the effectiveness of the AIPPs in providing greater opportunity to Australian industry. The Committee is aware that the legislative requirement for AIPPs to be submitted is very recent and that it will be some time before any impact it has can be determined. It is clear, though, that the *Australian Jobs Act 2013* (Cth) was intended to improve opportunities for local industry participation.

3.35 The Department of Commerce (DCom) advised that its 'Federal counterpart indicate[d] that such data [on the amount of local content generated through federal government initiatives such as AIPPs] does not exist.'¹⁶¹ DCom is aware of only 'one clear case where a draft participation plan was rejected on the grounds of unacceptably low levels of Australian content with a consequent revision of the plan, to a more favourable local content level.'¹⁶²

3.36 For DCom, AIPPs are not used to align a project proponent's business and procurement models 'to local price capacity and capability.'¹⁶³ Rather:

*it is important to understand that industry participation plans generally serve as a basis for ongoing and structured discussion between project proponents and government on contract outcomes and steps that may be taken to enhance local competitiveness.*¹⁶⁴

3.37 According to DCom, the federal government's use of AIPPs was reviewed in 2011–2012, with the resulting improvements including:

- public listing of projects;
- preparing plans;
- public summaries of approved plans; and

159 Department of Industry, *Australian Industry Participation National Framework*, 2001, p 3.

Available at:

<http://www.industry.gov.au/industry/AustralianIndustryParticipation/Pages/AustralianIndustryParticipationNationalFramework.aspx>. Accessed on 2 January 2014.

160 Submission No. 38 from Chamber of Commerce and Industry of Western Australia (Inc), 25 November 2013, p 1.

161 Submission No. 53 from Department of Commerce, 28 February 2014, p 1.

162 *ibid.*

163 *ibid.*

164 *ibid.*

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- realignment of federal industry programs ‘to achieve closer linkages to the outcomes from proponent discussions.’¹⁶⁵

3.38 Mineral and energy associations and supply groups support the continued use of AIPPs.¹⁶⁶

3.39 Assessment of the effectiveness of the federal AIPPs is beyond the scope of this Inquiry.

Formalisation of Australian Industry Participation Plans

3.40 As noted above, the *Australian Jobs Act 2013* (Cth) commenced on 27 December 2013. The Explanatory Memorandum to the Australian Jobs Bill 2013 states that ‘Australian companies have demonstrated that they can successfully compete against global companies to win work supplying major projects.’¹⁶⁷ Since the introduction of the AIP National Framework in 2001, Australian industry has faced a number of challenges, including:

- increasing globalisation, which increases the challenge of accessing existing global supply chains;
- a strong Australian dollar;
- a move toward modularisation;
- increasing complexity in the size and scope of work packages;
- the movement of design, procurement and contract management offshore; and
- a lack of readily available information on the capabilities and available capacity of Australian industry.¹⁶⁸

3.41 The then federal government argued that if it is accepted that AIPPs ‘lead to improved opportunities for Australian industry, the absence of formal AIP plans will lead to reduced opportunities for competitive Australian Suppliers.’¹⁶⁹

3.42 The Department of Innovation, Science, Research and Tertiary Education analysis cited in the Australian Jobs Bill 2013 Explanatory Memorandum suggests that, first, there were 23 major projects each year without a formal AIPP and, second, that the average project size over the previous two years was \$1.4 billion. This means that the total value of major projects without a formal AIPP was approximately \$32 billion.¹⁷⁰

165 Submission No. 53 from Department of Commerce, 28 February 2014, p 1.

166 *ibid.*

167 Explanatory Memorandum, Australian Jobs Bill 2013, (Cth), p 9.

168 *ibid.* p 9, p 14 and pp 21–27.

169 *ibid.* p 24.

170 Explanatory Memorandum, Australian Jobs Bill 2013, (Commonwealth of Australia), p 43.

- 3.43 The ICN estimates that a well-executed AIPP increases local content by five per cent, meaning that a formal AIPP for each of the 23 major projects ‘could increase opportunities for competitive local industry by about \$1.6 billion per annum.’¹⁷¹
- 3.44 Again, while this analysis involves all major investment projects in Australia and cannot be directly extrapolated to LNG projects, it does indicate the potential for substantial benefits to flow from AIPPs for LNG projects.
- 3.45 In his report, *Improving Australian industry participation in the resources sector supply chain*, Dr Martin West stated that a survey of 12 project proponents and 7 EPCMs (engineering, procurement and construction management companies) revealed that 57 per cent ‘actively looked at local industry participation’ and 43 per cent ‘sometimes, rarely or never take into account guidelines regarding the use of Australian suppliers.’¹⁷²
- 3.46 The Explanatory Memorandum for the *Australian Jobs Bill 2013* acknowledges the ‘lack of comprehensive and verifiable information about Australian industry participation in major projects.’¹⁷³ It also noted the inconsistent approaches taken by Australian States and Territories in their respective local content policies.
- 3.47 Australian suppliers had also expressed concern that, due to the challenges listed above, they were ‘not winning work to provide goods and services into major projects within Australia and overseas even where they may be competitive.’¹⁷⁴ As most of the evidence presented to the Committee related to Western Australian initiatives, this issue will be addressed below.
- 3.48 It was in this context that the federal government introduced the *Australian Jobs Bill 2013* to increase project investors’ awareness of Australian industry capabilities.
- 3.49 Based on the following, the Australian Senate’s Economics Legislation Committee’s *Exposure Draft of the Australian Jobs Bill 2013* states that there was ‘broad-based support for the underlying intent of the proposed legislation’:¹⁷⁵
- the ICN ‘emphasised that it is in favour of strengthening the rules for Australian Industry Participation’;
 - the Australian Industry Group ‘strongly supports the broad intent of the Australian Jobs Bill’;

171 *ibid*, p 43.

172 West, Martin, *Improving Australian industry participation in the resources sector supply chain*, October 2012, cited in Explanatory Memorandum, Australian Jobs Bill 2013, (Commonwealth of Australia), p 25.

173 Explanatory Memorandum, Australian Jobs Bill 2013, (Commonwealth of Australia), p 25.

174 *ibid*, p 21.

175 Economics Legislation Committee, *Exposure Draft of the Australian Jobs Bill 2013*, The Senate, Commonwealth of Australia, May 2013, p 15.

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- the CCIWA supports ‘the Government’s focus on maximising Australia[n] industry participation’;
- Chevron ‘shares the Government’s interest in maximising local content’;
- The ASI submitted that ‘a stronger policy framework to soften the effect of the patchwork economy is urgently needed’; and
- The Australian Manufacturing Workers’ Union (AMWU) and the Australian Workers’ Union (AWU) saw the legislation as ‘absolutely fundamental to the entire agenda... for Australian Manufacturing’ and argued that the Bill was ‘essential’ and needed to be passed ‘immediately.’¹⁷⁶

3.50 While the *Australian Jobs Act 2013* (Cth) aimed to address the challenges faced by Australian suppliers and, thus, increase local content on major projects, its introduction was not universally celebrated. The Senate Committee received submissions stating concerns in relation to:

- increased government intervention in the form of red tape;
- increased financial cost to business and government;
- the \$500 million capital expenditure threshold, with those such as the ASI, the ICN, the AMWU and the AWU arguing that it was too high, while the CCIWA submitted that it was too low;
- the definition of the trigger date for the provision of an AIPP;
- the six month reporting periods;
- the complexity of the Bill; and
- governance arrangements, particularly the proposed Advisory Board.¹⁷⁷

3.51 Following consideration of the evidence, the Senate Committee recommended that the Bill be introduced.¹⁷⁸

3.52 Submissions to this Committee, the Economics and Industry Standing Committee, also expressed concern in relation to the *Australian Jobs Act 2013* (Cth). For example, when discussing the number of Australian jobs available on the Prelude facility during the warranty period and commissioning stages, the AMWU stated that ‘if you look at the federal Australian participation program, they are exempt from that. No Australian participation is required.’¹⁷⁹

176 Economics Legislation Committee, *Exposure Draft of the Australian Jobs Bill 2013*, The Senate, Commonwealth of Australia, May 2013, pp 15–16.

177 *ibid*, pp 16–25.

178 *ibid*, p 26. Note: There was a dissenting report by the Coalition Senators on the committee.

179 Mr Steve McCartney, State Secretary, Australian Manufacturing Workers Union, *Transcript of Evidence*, 1 November 2013, p 5.

- 3.53 The CCIWA also expressed concerns in relation to the potential implications of the legislation. These include what CCIWA views as the risk of duplication of state and federal policies; the lack of clarity around the role and size of the Australian Industry Participation Authority and the Australian Industry Participation Advisory Board; the complex and onerous requirements contained in the Act; the materiality threshold of \$500 million and the proposed indexation factor; the unreasonable trigger date definition; and the penalties for non-compliance.¹⁸⁰ Discussion of some of these concerns is contained in Volume 2.
- 3.54 It is also important to note that there is considerable uncertainty in relation to the current application of the *Australian Jobs Act 2013* (Cth). While the Act commenced on 27 December 2013, it is not certain how, and to what extent, it will be implemented by the Coalition Government.
- 3.55 DCom advised there are a number of steps under the Act that are yet to be considered, including the appointment of the Australian Industry Participation Authority, approval of the AIPP templates and guidelines by that Authority, and the development of a legislative instrument that sets out 'the functions and programs to be administered by the AIP Authority and other matters.'¹⁸¹ DCom also advised that 'the Government may consider the repeal of the Australian Jobs Act as part of the broader deregulation agenda. However, the Government has not made a decision on this matter.'¹⁸² Furthermore, no indication has been given to states and Territories that they will be afforded an opportunity to comment on the future of the Act.¹⁸³
- 3.56 This lack of certainty is of concern as it has the potential to exacerbate what major oil and gas companies view as the increasing cost and over-regulation of industry in Australia. This is discussed further in Volume 2.
- 3.57 It is essential that the federal and state governments resolve these issues as a matter of priority.

Finding 14

There is a lack of certainty about the implementation of the *Australian Jobs Act 2013* (Cth) which will add to the perceived risk of doing business in Australia. In particular, the lack of Australian Industry Participation Plan (AIPP) templates and an Australian Industry Participation authority and mandate, together with a lack of clarity about the meaning of full, fair and reasonable opportunity for local companies, render the *Australian Jobs Act 2013* (Cth) obsolete for current and future major projects.

180 Submission No. 38 from Chamber of Commerce and Industry of Western Australia (Inc), 25 November 2013, p 5.

181 Mr Gavin Agacy, Senior Project Manager, Department of Commerce, Industry Participation Branch, Electronic Mail, 20 December 2013, p 1.

182 *ibid*.

183 Submission No. 53 from Department of Commerce, 28 February 2014, p 5.

Finding 15

Certainty about the implementation of the *Australian Jobs Act 2013* is just as important as the substance of the Act.

Recommendation 6

The Western Australian Government encourage and work with the Commonwealth Government to provide certainty for project proponents in relation to the *Australian Jobs Act 2013* (Cth) and its implementation.

Western Australian local content initiatives

Local Industry Participation Framework

- 3.58 Acknowledging that the ‘local market to supply goods and services to major resource projects has become more competitive and complex,’ in November 2010 the Western Australian Government reviewed the operation of its local content policy.¹⁸⁴ The resulting Local Industry Participation Framework (the Framework) notes the state government’s commitment ‘to the principle of full, fair and reasonable opportunity for competitive local suppliers to participation Western Australia’s resource projects.’¹⁸⁵
- 3.59 The Department of Commerce (DCom) advised that the Framework was introduced in July 2011 ‘in a context of the erosion of high levels of natural protection enjoyed by local suppliers to the State’s resource sector.’¹⁸⁶ The Department attributes the ‘significantly higher levels of overseas competition’ to the following:
- increasing modularisation, with modules constructed overseas in low-cost centres;
 - competition from overseas manufacturers, particularly from China, Japan, Korea, Thailand and Vietnam;
 - movement and consolidation of design, procurement and contract management offshore in areas such as Reading, Yokohama, Houston and Singapore;
 - closer project equity and sourcing links;
 - communication and technology developments; and
 - the strong Australian dollar.¹⁸⁷

184 Department of Commerce, *Western Australian Government Local Industry Participation Framework*, Government of Western Australia, Perth, nd, p 3.

185 *ibid*, p 5.

186 Submission No. 23 from Department of Commerce, 4 September 2013, p 3 and p 5.

187 Submission No. 23 from Department of Commerce, 4 September 2013, pp 5–6.

3.60

This Framework sets out the 10 steps involved in the state government's revised approach:

1. Strategic focus: improving government 'appreciation of international business and procurement trends impacting on the Western Australian economy';
2. Supplier performance: Working with proponents and suppliers 'to improve the competitive performance' of WA industries, to 'develop a shared vision of growth opportunities' and to examine the 'potential to improve supplier productivity';
3. Definition of local benefit: take a 'broader approach to the identification of benefits accruing to Western Australia,' including expanding the reporting of benefits and increasing the number of projects subject to reporting requirements;
4. Strategic projects: Paying greater attention to priority projects, including emphasising the use of Industry Participation Plans (IPPs);
5. ICNWA: 'Realign activity to ensure that the ICNWA provides greater strategic input to the State Government on market trends and supplier performance';
6. Local Industry Participation Unit: Strengthening the role of this unit to ensure local suppliers have full, fair and reasonable opportunity, and assist ICNWA in monitoring IPP implementation;
7. Commonwealth Government: Encouraging the federal government to take a more active role in promoting Australian industry;
8. International cooperation: Working with other countries to secure opportunities for collaboration between the State and its major partners in relation to local content;
9. Leadership: Accepting 'market forces as the determinant of viability' the state government will emphasise that there are only two possible results from a 'full, fair and reasonable opportunity to participate': either a 'successful supplier arrangement' or a 'reasonable explanation' as to why that is not feasible; and
10. Skilled workforce: Monitoring the recent overhaul of the planning of workforce requirements, application of training resources, and support for attracting and retaining skilled migrants.¹⁸⁸

188 Department of Commerce, *Western Australian Government Local Industry Participation Framework*, Government of Western Australia, Perth, nd, pp 5–7; and Submission No. 23 from Department of Commerce, 4 September 2013, p 4.

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3.61 While the effectiveness of the Framework is discussed below, at this point it is worth noting some of its impacts as reported by DCom:

- ‘the willingness of project proponents in the oil and gas and iron ore sectors to work with the Department and suppliers’ to develop a ‘shared vision’ of suppliers’ future role;
- promotion of debate on the government’s role ‘in enhancing local supply’;
- broadening of ‘the focus on local content’ from its emphasis on steel fabrication during the construction phase to ‘include operational sourcing and other forms of benefit which accrue from a proponent’s presence in the State’; and
- situating ‘the local content debate in an appropriate context,’ including changing market conditions and reduced levels of natural protection.¹⁸⁹

State Agreements

3.62 State Agreements are contracts ‘between the Government of Western Australia and proponents of major resources projects which are ratified by an Act of the State Parliament.’¹⁹⁰ Each project-specific State Agreement is ‘negotiated on an ad hoc basis’ and then ratified by its own State Agreement Act.¹⁹¹ The *Government Agreements Act 1979* (WA) is the enabling legislation for each State Agreement Act.

3.63 State Agreements ‘specify the rights, obligations, terms and conditions for development of the project and establish a framework for ongoing relations and cooperation between the State and the project proponent.’¹⁹²

3.64 The objectives of State Agreements are to:

- *Facilitate the efficient and effective development of the State’s natural resources;*
- *Manage the development by ensuring it is consistent with State policies on issues such as land use, conservation, competition, infrastructure sharing, secondary processing development and maximising local content; and*
- *Ensure that development provides economic and social benefits for the Western Australian community.*¹⁹³

189 Submission No. 53 from Department of Commerce, 28 February 2014, pp 4–5.

190 Department of State Development, *State Agreements*. Available at: <http://www.dsd.wa.gov.au/6641.aspx>. Accessed on 6 January 2014.

191 Hillman, Richard, ‘The future role for State Agreements in Western Australia,’ *Australian Resource and Energy Law Journal*, vol. 25, 2006, p 293.

192 Department of State Development, *State Agreements*, Government of Western Australia, Perth, nd, p 3. See also: <http://www.dsd.wa.gov.au/6641.aspx>.

- 3.65 The Department of State Development (DSD) advised that State Agreements are high level and relatively broad agreements supported by more detailed industry participation plans.¹⁹⁴ DSD also advised that more recent State Agreements ‘probably have a more overt reference around local content and community development contributions.’¹⁹⁵
- 3.66 Western Australia is one of the few Australian and overseas jurisdictions to use State Agreements for resource projects. Recently, Tasmania and the Northern Territory have entered into such agreements and, internationally, similar agreements are typically used in developing nations.¹⁹⁶ As at the end of the 2012–2013 reporting period, there were 64 State Agreement Acts administered by DSD, with three of these pertaining to major gas projects:
- the *North West Gas Development (Woodside) Agreement Act 1979* (WA);
 - the *Barrow Island Act 2003* (WA) (which incorporates the Gorgon Gas Processing and Infrastructure Project Agreement); and
 - the *Natural Gas (Canning Basin Joint Venture) Agreement Act 2013* (WA).¹⁹⁷
- 3.67 There is no State Agreement in place for Woodside’s Pluto project in the Carnarvon Basin, which was approved for development in 2007. There is also no State Agreement for Chevron’s Wheatstone project, the final investment decision (FID) for which was taken in September 2011. Wheatstone is subject to a State Development Agreement, which is a commercial contract between the State and Chevron.
- 3.68 While approximately 70 per cent of Western Australia’s resource production in 2002 came from projects subject to State Agreements, new State Agreements are much less common than they were in the period 1960 to 1999. Table 3.1 provides a breakdown of 64 current State Agreements according to their establishment date.

193 Department of State Development, *State Agreements*, Government of Western Australia, Perth, nd, p 1.

194 Ms Nicola Cusworth, Deputy Director General, Department of State Development, *Transcript of Evidence*, 19 June 2013, p 6.

195 Ms Gail McGowan, Deputy Director General, Department of State Development, *Transcript of Briefing*, 19 June 2013, p 6.

196 Hillman, Richard, ‘The future role for State Agreements in Western Australia,’ *Australian Resource and Energy Law Journal*, vol. 25, 2006, p 293. Hillman notes that some Canadian Provinces have used State Agreements.

197 Department of State Development, *State Agreements*. Available at: <http://www.dsd.wa.gov.au/6641.aspx>. Accessed on 6 January 2014.

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Table 3.1 Time period of the ratification of current State Agreements

Period	Number of State Agreements
Prior to 1960	3
1960–1969	12
1970–1979	19
1980–1989	8
1990–1999	12
2000–2009	7
2010–2013	3
Total	64

3.69 The decline in the number of State Agreements does not necessarily mean a decline in the value of projects subject to such agreements. For example, the *Barrow Island Act 2003* (WA) is just one agreement, but represents enormous dollar value and production capacity.

3.70 The decline may also be due to factors such as the particular types of resource developments underway during each period. For example, the 1960s, 1970s and 1980s saw major developments in iron ore as well as salt, nickel and alumina. The development of more sophisticated legislation may also mean that State Agreements are not as necessary as they once were.

3.71 Nevertheless, the decline in the number of agreements entered into in the past thirteen years is significant.¹⁹⁸

3.72 The following provides insight into considerations factored into State Agreement negotiations between a government and a resource project proponent:

The government will seek a State Agreement where it perceives that the general mining legislation is 'incapable of implementing government policy for a specific project.' The developer will enter into negotiations where it believes a State Agreement is a commercially viable document that will create an efficient framework for the project, based upon a number of factors. The negotiation of the State

198 Hillman, Richard, 'The future role for State Agreements in Western Australia,' *Australian Resource and Energy Law Journal*, vol. 25, 2006, p 293.

*Agreement is thus a complex and lengthy process designed to satisfy the economic and policy objectives of the parties.*¹⁹⁹

3.73 Negotiations around State Agreements should include consideration of:

- *The assurance and certainty required by the developer*
- *Issues associated with the negotiation and evaluation of State Agreements*
- *The negotiated trade-off between the State and developer*
- *The desired working relationship between the parties*
- *Co-ordination and facilitation under a State Agreement*
- *The suitability of the general legislation.*²⁰⁰

3.74 Given the State's objectives for State Agreements, it would be reasonable to expect that they would be advantageous for all resource projects. However, there are limitations to such agreements. For example, while these Agreements provide oil and gas companies with certainty over the life of the project, they are also relatively inflexible in that changes must be ratified by Parliament. It is also not clear whether State Agreements are the most efficient or effective way for the State to achieve its desired policy objectives.

3.75 The Committee asked DSD to advise how it was determined which projects would be subject to a State Agreement. DSD responded as follows:

*The State uses different legal instruments and combinations depending on project circumstances. The State must assess which legal instrument would be best for the project.*²⁰¹

3.76 DSD further advised that 'for significant or complex projects,' State Agreements, State Development Agreements or Special Acts are the legal instruments it has available to achieve its objectives.²⁰²

3.77 The Committee is not satisfied with this response as it does not make transparent how DSD determines which projects should be developed using State Agreements. It also does not reassure the Committee that the recommendations in the Auditor General's 2004 report, *The management of State Agreement Acts*, have been acted upon. At that time, the Auditor General found that it was 'unclear why some resource projects are

199 Hillman, Richard, 'The future role for State Agreements in Western Australia,' *Australian Resource and Energy Law Journal*, vol. 25, 2006, p 295. See also: Independent Review Committee (the Keating Review), *Review of project development approvals system*, Crown in the right of the State of Western Australia, 2002.

200 Hillman, Richard, 'The future role for State Agreements in Western Australia,' *Australian Resource and Energy Law Journal*, vol. 25, 2006, p 295.

201 Submission No. 51 from Department of State Development, 27 February 2014, p 2.

202 *ibid*.

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established and operated under Agreements and others under existing statutory laws.²⁰³ The Auditor General held that criteria needed to be developed to 'ensure consistency, equity and transparency' in this regard.²⁰⁴

3.78 While an assessment of the effectiveness or otherwise of State Agreements in achieving their objectives is beyond the scope of this Inquiry, the Committee notes the findings from the Auditor General's 2004 examination of 'the extent to which State Agreements reach their main objectives' and the 'effectiveness of their administration'.²⁰⁵

3.79 The Auditor General found that:

*Agreements have delivered major projects however their success in delivering supplementary downstream processing is less clear. Agreement management has largely focused on facilitation and there is scope to use more robust and ongoing management practices.*²⁰⁶

3.80 The Auditor General also found that due to a lack of appropriate agency monitoring, it was difficult to determine how effective State Agreements had been in maximising local content opportunities.²⁰⁷ It was recommended that criteria be developed 'to better guide the use of Agreements in a mature natural resource economy' and to report 'Agreement status and performance to Parliament'.²⁰⁸

Finding 16

It is not clear what criteria the Department of State Development applies in its assessment of whether a resource project should be developed through a State Agreement.

Finding 17

It is not clear what progress has been made on the implementation of the Auditor General's 2004 recommendations in relation to developing a structured approach to evaluating State Agreement performance.

Finding 18

It is not clear whether State Agreements are the most effective or efficient means of achieving government policy objectives.

203 Auditor General for Western Australia, *Developing the state: The management of State Agreement Acts*, Office of the Auditor General, Perth, June 2004, p 7.

204 *ibid.*

205 *ibid.*, p 5.

206 *ibid.*, p 4.

207 *ibid.*, p 4.

208 *ibid.*, p 4.

Finding 19

Despite improvements in the implementation and monitoring of State Agreement local content provisions, the reported data only provides information about major project tenders and contracts after the decisions have been made.

Recommendation 7

The Department of State Development advises Parliament of its approach to evaluating State Agreement performance and its efforts to improve reporting on State Agreement performance and status.

Recommendation 8

The Department of State Development undertake an assessment of the effectiveness of State Agreements in achieving the government's stated aims and objectives, and report the results to Parliament.

Recommendation 9

State Agreement local content reporting requirements include project proponents providing further relevant detail about decisions impacting local content, with this information being made in a transparent manner and subject to greater public scrutiny, including the tabling of information in Parliament.

State Agreement with the Goolarabooloo Jabirr Jabirr Peoples

3.81 The state government has entered into an agreement with the Goolarabooloo Jabirr Jabirr Peoples relating to the establishment of an LNG precinct in the vicinity of James Price Point in the Kimberley region of Western Australia. This agreement, the *Browse (Land) Agreement Act 2012*, sets out and limits the use of the proposed LNG Precinct, limits further LNG development on the Kimberley coastline, provides for State remediation of Precinct land and grants title within the Precinct to the Native Title party at the end of the Precinct life.²⁰⁹

3.82 Under this agreement, Woodside agreed to provide a \$1.5 billion compensation package to the Traditional Owners of the James Price Point Land over 30 years in return for relinquishing their native title interests.²¹⁰ The benefits included funds to establish businesses and investment, and for housing, education, training, land management and social initiatives, and direct and indirect employment opportunities.²¹¹

209 Annexure 2—LNG Precinct Plan, *Browse (Land) Agreement Act 2012* (WA).

210 Hon Colin Barnett, MLA, (Premier), *Consent agreement reached for Kimberley LNG precinct*, Media Statement, Government of Western Australia, Perth, 6 May 2011; Burrell, Andrew, "Gas fight do-gooders failed us", says indigenous leader Wayne Bergmann, *The Australian*, 19 September, 2013, p 2.

211 Hon Colin Barnett, MLA, (Premier), *Consent agreement reached for Kimberley LNG precinct*, Media Statement, Government of Western Australia, Perth, 6 May 2011, p 2.

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- 3.83 With the decision to consider FLNG as a development concept for the Browse fields, Woodside was not obliged to be part of this agreement, and so withdrew from it. In September 2013 the Indigenous Stock Exchange (ISX) reported that while Woodside's James Price Point Project had been 'scrapped' the company was 'preparing to pay the remaining millions of dollars it owes to the traditional owners of James Price Point.'²¹² According to the ISX:

*funding for an \$8 million children's reading program has begun and is being hailed a success. About \$16 million for education and healthcare programs, funeral assistance and Return to Country initiatives and a further \$5 million to fund a business development program, is still due.*²¹³

- 3.84 In September 2013 Woodside stated that the company had made, or was 'in the process of making, \$25.6 million in payments in accordance with agreement provisions.'²¹⁴ On 16 October 2013, the Committee asked Woodside's Mr Cole if there was anything specifically that Woodside was willing to commit to the advancement of the native people of the James Price Point area. Mr Cole stated that 'going forward, we [Woodside] will need to assess what is an appropriate contribution to the communities. As a general principle, as a company we support the communities where we operate.'²¹⁵
- 3.85 The Committee agrees with Woodside's former chief executive, Mr Don Voelte, that 'the company should honour the compensation package pledged to indigenous communities [and that] the intent of the package was always about sharing the rewards of the gas development rather than paying Aborigines for the land, which was no longer needed.'²¹⁶

Finding 20

Aboriginal communities in the Kimberley have diminished economic opportunity as a result of the adoption of FLNG instead of onshore processing at James Price Point.

212 Indigenous Stock Exchange, *James Price Point Traditional Owners await Woodside funds*, 19 September 2013, p 1. Available at: <http://www.isx.org.au/forums/read.php?18,11646>. Accessed on 4 February 2014.

213 *ibid.*

214 Burrell, Andrew, "'Gas fight do-gooders failed us", says indigenous leader Wayne Bergmann,' *The Australian*, 19 September, 2013, p 2.

215 Mr Robert Cole, Executive Director, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 9.

216 Burrell, Andrew, "'Gas fight do-gooders failed us", says indigenous leader Wayne Bergmann,' *The Australian*, 19 September, 2013, p 2.

Recommendation 10

The Western Australian Government work with all project proponents, including Woodside, to ensure that Aboriginal communities benefit from resource developments in the state.

Industry Capability Network of WA

3.86 The ICN was originally a Western Australian initiative which, following the development of the AIP National Framework, was expanded across Australia and New Zealand. The ICN became a 'national network of independent industry consultancies managed by industry and sponsored by state governments to achieve beneficial outcomes for local Australian and New Zealand industry and economy.'²¹⁷ Clearly, ICNWA focuses on WA projects, assisting Western Australian suppliers and helping project proponents fulfil their obligations to afford local suppliers a full, fair and reasonable opportunity to tender for work.²¹⁸

3.87 According to ICNWA, its 'consultancy service covers Western Australian major projects, global supply chain access service and information communication technology.'²¹⁹ According to CCIWA, ICNWA 'promotes local and Australian industry capability to major project developers, service providers and government agencies both nationally and abroad.'²²⁰ The services offered by ICNWA include:

- identifying competitive Australian made goods and services;
- linking competitive Australian made goods and services into global supplier registration systems of global engineering companies;
- locating potential Australian partners for joint ventures and technology transfers;
- providing industry briefings and seminars on WA investment project procurement opportunities; and
- supplying industry development services such as capability analysis, industry specific capability directories, investigation into infrastructure requirements and many others.²²¹

3.88 ICNWA has been administered by CCIWA on behalf of the state government for the past 22 years.²²² For the 2012–2013 financial year, CCIWA received approximately

217 Submission No. 10 from Chamber of Commerce and Industry Western Australia (Inc), 30 August 2013, p 15.

218 *ibid.*

219 Industry Capability Network, *Industry capability network. Western Australia*. Available at: http://www.icn.org.au/wa_home. Accessed on 2 January 2014.

220 Chamber of Commerce and Industry Western Australia (Inc), *Industry capability network Western Australia*. Available at: <http://www.cciwa.com/resources-energy/industry-capability-network>. Accessed on 2 January 2014.

221 Industry Capability Network, *Industry Capability Network. Western Australia*. Available at: http://www.icn.org.au/wa_home. Accessed on 2 January 2014.

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\$750,000 government funding to operate ICNWA. DCom submitted that a 2012 'independent audit of [the] ICNWA contract resulted in some readjustment in funding and reporting arrangements.'²²³ Due to concerns relating to the ICNWA business model, particularly 'in the context of increasingly competitive and complex environment and a stringent budget climate,' the ICNWA contract was not renewed.²²⁴

3.89 CCIWA confirmed that the tender for 2013–2014 was 'scaled back to \$250 000 as a part of the new open tender that was put out to the market.'²²⁵ Subsequent to submitting for that reduced funding, CCIWA received official advice of further funding cuts, and informed the Committee that 'the vendor identification service, which is the tender we [CCIWA] resubmitted for and that funds the Industry Capability Network, was cancelled as a consequence of budget deliberations this year.'²²⁶ DCom confirmed that, following budget discussions, 'a decision was taken that further funding for a three year period could not be guaranteed.'²²⁷

3.90 CCIWA further advised that the decision to withdraw government funding for ICNWA was, from their perspective, a 'disappointing outcome,' with CCIWA now considering alternative business models to ensure that small to medium employers could still be supported in their efforts to gain work on major projects.²²⁸

3.91 The Committee notes that two of the steps in the 2011 Local Industry Participation Framework refer directly to ICNWA. Step five involves ensuring ICNWA has greater strategic input to the government and step six is to assist ICNWA in monitoring IPP implementation.

3.92 Given this, DCom was asked about the impact the funding cuts to ICNWA would have on the application of the Framework. DCom 'understands that ICNWA will continue to operate funded in part by project proponents with an increased contribution from the Federal Government.'²²⁹ DCom further advised that it 'continues to liaise with ICNWA on an as needs basis.'²³⁰

222 Submission No. 10 from Chamber of Commerce and Industry Western Australia (Inc), 30 August 2013, p 15; Mr John Nicolau, Chief Officer, Member Services and Advocacy; Chief Economist, Chamber of Commerce and Industry of Western Australia, *Transcript of Evidence*, 1 November 2013, p 4 and p 10.

223 Submission No. 53 from Department of Commerce, 28 February 2014, p 3.

224 *ibid*, p 3.

225 Mr John Nicolau, Chief Officer, Member Services and Advocacy; Chief Economist, Chamber of Commerce and Industry of Western Australia, *Transcript of Evidence*, 1 November 2013, p 5.

226 *ibid*.

227 Submission No. 53 from Department of Commerce, 28 February 2014, p 3.

228 Mr John Nicolau, Chief Officer, Member Services and Advocacy; Chief Economist, Chamber of Commerce and Industry of Western Australia, *Transcript of Evidence*, 1 November 2013, p 5.

229 Submission No. 53 from Department of Commerce, 28 February 2014, p 3.

230 *ibid*, p 5.

3.93 The Committee understands that ‘at least two other States are currently reassessing their funding relationships with their Industry Capability Network providers.’²³¹

ProjectConnect

3.94 As well as administering ICNWA for the state government, CCIWA also runs ProjectConnect to help address the ‘information asymmetry’ faced by small businesses who want to gain work on major projects.²³²

3.95 ProjectConnect, which is not government funded, is an online electronic library or database that ‘stores, organises and distributes information on suppliers, development projects and project supply opportunities.’²³³ The database contains details of:

- project proponents’ listings of the goods and services it will purchase;
- registrations from component suppliers wanting to obtain work from a project’s successful tenderers; and
- the name and contact details of successful tenderers.²³⁴

Effectiveness of Western Australian local content initiatives

3.96 The November 2013 *Local Content Report* notes that the state’s economy is performing strongly, with strong demand in iron ore and natural gas. It further reports that:

*this ongoing buoyancy in the May 2013 to November 2013 period is demonstrated by the increase from \$43 billion to \$57 billion in the value of publicly announced, locally awarded contracts, which has occurred since July 2011 (the date of the introduction of the State Government’s Local Industry Participation Framework). It is estimated that this aggregated figure represents 202,920 employment positions (direct and indirect) created or maintained.*²³⁵

3.97 As part of the state government’s Local Industry Participation Framework, in October 2011 the government introduced its Industry Facilitation and Support Program (IFSP),

231 *ibid*, p 5.

232 Mr John Nicolau, Chief Officer, Member Services and Advocacy; Chief Economist, Chamber of Commerce and Industry of Western Australia, *Transcript of Evidence*, 1 November 2013, p 4.

233 Submission No. 10 from Chamber of Commerce and Industry Western Australia (Inc), 30 August 2013, p 15. ICNWA launched ProjectConnect in 2004. Following the development of ICN Gateway in July 2008, ProjectConnect became a business unit of CCIWA.

234 Submission No. 10 from Chamber of Commerce and Industry Western Australia (Inc), 30 August 2013, p 15; and Mr John Nicolau, Chief Officer, Member Services and Advocacy; Chief Economist, Chamber of Commerce and Industry of Western Australia, *Transcript of Evidence*, 1 November 2013, p 4.

235 Department of Commerce, *Local content report*, Government of Western Australia, Perth, November 2013, p 3. It is not known how much of this local content spend is on items such as airfares, accommodation et cetera, and how much is actually on capital item procurement, skilled services and the like.

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which was designed to 'to provide local suppliers with a financial incentive to undertake initiatives to build their competitiveness and productivity.'²³⁶ Support of up to \$20,000 is provided to small to medium enterprises on a dollar for dollar basis.²³⁷

DCom advises that the program 'focusses on addressing the basic issue of communication between suppliers and the resource market [and that] funding to suppliers in support of proposed initiatives is only provided on the basis that consultation with the market has occurred.'²³⁸

3.98 Up to November 2013, there had been two rounds of the IFSP, resulting in the approval of 148 applications for assistance totalling a State funding commitment of \$2.926 million. The third round of the IFSP, called the Onslow Round, was co-funded by the state government and Chevron.²³⁹ In February 2014, DCom advised that the three funding rounds led to 161 companies being assisted.

3.99 A requirement of all IFSP recipients is that they report on the outcomes of that assistance. As at November 2013, 68 outcomes reports had been received. The grant value represented in these reports was \$1.496 million, and the combined value of resource contracts reported was \$143.65 million. This equates to a leverage ratio of \$1:\$94.²⁴⁰ By February 2014, 83 companies had reported outcomes totalling \$151.5 million of awarded contracts.²⁴¹

3.100 According to DCom, it was the success of the IFSP which led to 'co-funding with Chevron and currently, potential opportunity is being discussed with a number of other major proponents.'²⁴²

236 Department of State Development, *Industry Facilitation and Support Program, Newsletter*, Edition 2, August 2013. Available at: http://www.commerce.wa.gov.au/scienceinnovation/content/About_Us/Key_focus_areas/Local_Industry_Participation/Newsletters/issue-2-2013-08/ifsp.html. Accessed on 6 January 2014. See also: Department of Commerce, 'State of the future: Expanding support for local industry,' *Industry, Science and Innovation News*, Edition 21, 2012.

237 Department of Commerce, 'Industry Facilitation & Support Program,' *Newsletter* Edition 5, August 2013. Available at: http://www.commerce.wa.gov.au/scienceinnovation/content/About_Us/Key_focus_areas/Local_Industry_Participation/Newsletters/issue-5/Industry_Facilitation_Support.html. Accessed on 6 January 2014.

238 Submission No. 53 from Department of Commerce, 28 February 2014, p 4.

239 Hon Michael Mischin, MLC, Minister for Commerce, and Hon Brendon Grylls, MLA, then Minister for Regional Development, *Onslow businesses given a helping hand*, Media Statement, Government of Western Australia, Perth, 13 August 2013. Available at: <http://www.mediastatements.wa.gov.au/pages/StatementDetails.aspx?listName=StatementsBarnett&StatId=7661>. Accessed on 6 January 2014.

240 Department of Commerce, *Local content report*, Government of Western Australia, Perth, November 2013, p 13.

241 Submission No. 53 from Department of Commerce, 28 February 2014, p 4.

242 *ibid*.

3.101 However, as the local content reports and the IFSP program relate to all resource sector opportunities it is not possible to determine from this data the effectiveness of the framework overall, or the IFSP, in particular, in relation to the maximising of opportunities for local suppliers to the oil and gas industry. Furthermore, as Ms Nicola Cusworth, Deputy Director General, DSD, stated:

*one of the challenges, even with the developments that we have seen so far, is that the conventional resources developments such as iron ore and those kinds of industries have had much higher levels of local content than we have seen with oil and gas, even with the onshore developments.*²⁴³

3.102 The Chamber of Minerals and Energy of Western Australia (Inc) (CMEWA) also pointed to the Local Content Report, noting the 77 per cent local content in resource project contracts, including mining industry projects, since July 2011.²⁴⁴ Nevertheless, CMEWA also stated it was 'important to acknowledge that opportunities for local industry participation in gas projects are fundamentally different from mining projects due to the scale and complexity of some of the projects.'²⁴⁵

3.103 DSD advised that their approach to increasing local content is to try to persuade, rather than compel, companies to use local suppliers.²⁴⁶ The Department monitors and measures project proponents' compliance with State Agreement conditions. This information is then aggregated by DCom into its local content reports.²⁴⁷

3.104 APPEA, as the national representative body for Australia's oil and gas exploration and production industry, submitted that 'where local firms are capable and competitive, the ICN service has been widely embraced by proponents, providing maximum opportunity for suppliers.'²⁴⁸ Referring to the local content reports, APPEA also states that:

the substantial amount of contracts being awarded to local companies... is testament to the oil and gas industries support for initiatives, such as the Industry Capability Network (ICNWA), that aim

243 Ms Nicola Cusworth, Deputy Director General, Department of State Development, *Transcript of Briefing*, 19 June 2013, p 4.

244 Ms Nicole Roocke, Director, The Chamber of Minerals and Energy of Western Australia (Inc), *Transcript of Briefing*, 26 June 2013, p 6.

245 *ibid.*

246 Ms Nicola Cusworth, Deputy Director General, Department of State Development, *Transcript of Briefing*, 19 June 2013, p 4.

247 *ibid*, p 6.

248 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 23.

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*to support local companies efforts to capture the benefits of the pipeline of investment.*²⁴⁹

- 3.105 At a hearing, APPEA's Chief Operating Officer, Mr Stedman Ellis, confirmed that advice from their members was that ICNWA was:

*one of the singular areas where the state has built up expertise that has benefited both the project proponents and those smaller companies trying to connect with the opportunities... So, consistently, the advice we have received from our members is that is part of the system that is working well, because, in that area, the state has built up some technical expertise in terms of understanding the supply chain and execution requirements, and it is doing it in a way that delivers value both to project proponents and to small and medium enterprises trying to connect with that opportunity.*²⁵⁰

- 3.106 Mr Ellis argued that, 'in terms of how well it [ICNWA] is working, the evidence that we can see is that LNG projects that are in existence are sustaining levels of local content in the order of 70 per cent spend' and that 'the extent of local content being delivered in these projects is very substantial.'²⁵¹

- 3.107 CMEWA also draws on the 'continued improvement in rates and value of local industry participation' as indicated in the local content reports as evidence that the 'measures in place to support local content are functioning effectively.'²⁵²

- 3.108 In an April 2013 submission to the Senate Economics Legislation Committee, the CCIWA stated that the federal and state industry participation policies 'have been successful.'²⁵³ The CCIWA stated that:

*some \$29.9 billion worth of contracts have been awarded to Western Australian companies between July 2011 and November 2012. The level of Australian local content in Western Australian resources projects in the operations phase is currently at 94.7 per cent, while the level for projects under construction stands at 73.6 per cent.*²⁵⁴

249 Submission No. 47 from Australian Petroleum Production and Exploration Association Limited, 20 December 2013, p 17,

250 Mr Stedman Ellis, Chief Operating Officer, Australian Petroleum Production and Exploration Association Limited, *Transcript of Evidence*, 1 November 2013, p 11.

251 *ibid.*

252 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia, 30 August 2013, p 19. See also: Submission 40, from The Chamber of Minerals and Energy of Western Australia (Inc), 25 November 2013, p 2.

253 Submission No. 38 from Chamber of Commerce and Industry of Western Australia (Inc), 25 November 2013, p 4.

254 *ibid.*

- 3.109 Local content data is discussed further below, with local content over time provided in Tables 3.2 and 3.3. This data shows the significant variation in local content that occurs and that local content in the oil and gas sector is not as high as in the resource sector overall.
- 3.110 Evidence received from local content providers was more critical of the effectiveness of ICNWA. For example, the Committee heard that there was a lack of engagement with industry, resulting in a lack of knowledge about, and understanding of, the capability of Western Australian businesses. It was also suggested that ICNWA, rather than being an advocate for local industry, tends to regard project proponents as their primary clients.²⁵⁵ Another criticism of ICNWA was that while some extractive resource companies, such as Santos, Apache Energy and BHP, use ICNWA to contact suppliers who had registered their capability statement, many did not.²⁵⁶
- 3.111 The Committee understands that ICNWA has been subject to three reviews since 2011. According to local industry, these reviews have not resulted in an effective and functioning capability network.
- 3.112 However, when questioned on the reviews of the ICNWA, DCom stated that it was ‘incorrect to state there have been three reviews of the ICNWA since 2011,’ but acknowledged the 2012 independent audit of the ICNWA contract’s financial management.²⁵⁷
- 3.113 DCom advised that it had ‘increasing concerns as to the effectiveness of the ICNWA business model in terms of both identifying strategic trends in resource procurement and providing analysis of the reasons for local companies failing to secure resource contracts.’²⁵⁸

Local content for Western Australian LNG projects to date

- 3.114 The following provides information on local content for major Western Australian gas projects, namely the North West Shelf, Gorgon and Wheatstone projects.
- 3.115 As Table 3.2 shows, Australian content for Phase I and Phase II of the North West Shelf project was 73 per cent. For Phase III, while local content varied greatly for the three components, the average was 71 per cent. Woodside claimed Australian participation rates of 88 per cent for Phases I and II, and an average of 86 per cent for Phase III. The Australian participation rate was defined by Woodside as ‘the calculated level of

255 Closed hearing, *Transcript of Evidence*, 30 October 2013, pp 5–6.

256 Closed hearing, *Transcript of Evidence*, 15 November 2013, p 12.

257 Submission No. 53 from Department of Commerce, 28 February 2014, p 3.

258 *ibid*.

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participation for those items that could be procured or undertaken in Australia.’²⁵⁹ This definition is clearly problematic and is discussed further at paragraph 3.139.

Table 3.2: Woodside’s assessment of project costs and sourcing as at August 1995²⁶⁰ (dollars of the day*)

Facilities	Development costs (\$ million)	Overall Sourcing %		Claimed Australian participation rate %
		Australian	Overseas	
Phase I— North Rankin A platform and domestic gas facilities	1,921	73	27	88
Phase II— LNG trains 1 and 2	2,888	73	27	88
Phase III— LNG train 3 LPG Plant Goodwyn A platform	928 265 [#] 1,606	(71 av) 69 85 60	(28 av) 31 15 40	(86 av) 89 94 75
Operations (1984–1995)	3,072	82	18	88

*as provided by Woodside [#] ongoing at the time

259 Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 14.

260 Table 3.1 is reproduced from: Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 14.

Table 3.3 Cumulative Annual Reported local content on major LNG projects in Western Australia (millions) for contracts over \$100,000^a

Project	To August 1995 [#]		2005			2006			2008			2009		
	Australia	OS	WA	ES	OS	WA	ES	OS	WA	ES	OS	WA	ES	OS
North West Shelf[~]														
Value	5,497	2,111												
%	72	28												
North West Shelf (Operating)														
Value	2519	553	137	17	47	309	36	142						
%	82	18	68	8	23	63	7	29						
North West Shelf Expansion														
Value			139	17	190	293	26	403	16	<1	<1			
%			40	5	55	40	4	56	96	2	2			
Gorgon[*]														
Value			118	5	40	210	4	71	362	11	229	5,093	619	8,089
%			72	3	25	74	1	25	60	2	38	37	4	59
North Rankin 2														
Value									701	19	763	125	2	103
%									47	1	51	54	1	45

^a Compiled from information provided by Department of Commerce and the 1998 Standing Committee on Industry, Science and Resources report. [#] Woodside 1995 data [~]North West Shelf values and percentages are an average of the local content over the three phases of the project.

^{*} Wheatstone data for 2013 is to 30 June only. Due to overlaps in reporting dates, amounts have been calculated on averages over reporting periods.

^{*} Gorgon data for 2005 is an aggregate of 2001 to June 2005; and for 2013 is to 30 June.

No reports were provided for three quarters of 2007, so no 2007 data has been included in the table. WA contracts awarded for the first quarter of 2007 was \$17 million or 87 per cent. Pluto data was only provided for 2008. WA local content for 2008 was \$1,630 million, which is 32 per cent of the total.

Table 3.3 Cumulative Annual Reported local content on major LNG projects in Western Australia (millions) for contracts over \$100,000^a contd

Project	2010			2011			2012			2013		
	WA	ES	OS	WA	ES	OS	WA	ES	OS	WA	ES	OS
North West Shelf (Operating)												
Value	266	16	27	328	13	57	336	58	61			
%	86	5	9	82	3	14	74	13	13			
Gorgon*												
Value	3,568	384	4,516	4,969	276	2,776	4,115	237	1,980	1,911	73	692
%	42	5	53	62	3	35	65	4	31	71	3	26
Wheatstone [†]												
Value							2,835	478	2,979	878	168	294
%							45	8	47	65	13	22
North Rankin 2												
Value	75	3	73	211	4	104	167	13	9			
%	50	2	48	66	1	33	88	7	5			

^a Compiled from information provided by Department of Commerce and the 1998 Standing Committee on Industry, Science and Resources report. [†] Woodside 1995 data ~North West Shelf values and percentages are an average of the local content over the three phases of the project.

[†] Wheatstone data for 2013 is to 30 June only. Due to overlaps in reporting dates, amounts have been calculated on averages over reporting periods

* Gorgon data for 2005 is an aggregate of 2001 to June 2005; and for 2013 is to 30 June.

No reports were provided for three quarters of 2007, so no 2007 data has been included in the table. WA contracts awarded for the first quarter of 2007 was \$17 million or 87 per cent.

3.116 Table 3.3 combines the information from Table 3.2 with the data produced by DCom.

3.117 During a Committee hearing, Chevron's Managing Director, Mr Roy Krzywosinski, stated that:

*in developing the Gorgon and Wheatstone projects, Chevron has been committed to delivering the economic benefits of these projects to Australia and, in particular, to Western Australia. In just the construction phase, Gorgon and Wheatstone together will contribute nearly \$50 billion to the local economy.*²⁶¹

3.118 Noting that the total cost for the Gorgon project had increased from \$43 billion to \$52 billion, Mr Krzywosinski also stated that 'Gorgon to date has committed more than \$20 billion worth of work to Australian industry, of which more than 90 per cent has been committed to WA vendors and suppliers.'²⁶² Data in Table 3.3 supports this statement.

3.119 Table 3.3 also shows the relatively high levels of local content for the operating phase of the North West Shelf project.

3.120 During a June 2013 briefing, and in response to questions about local content, Shell advised the Committee that approximately 70 per cent of their operating contracts for operations and maintenance core services will be local content, which they expect to be 'worth over \$200 million a year to the Australian community.'²⁶³ No mention was made of Australian content not related to the operations and maintenance of the Prelude project.

3.121 At an October 2013 hearing, Mr Andrew Smith, Country Chair, Shell in Australia, confirmed that 'Shell expects that Prelude will have a local content component of around 70 per cent during its operations... it will add more than \$45 billion to Australia's GDP and will spend \$12 billion on Australian goods and services.'²⁶⁴

3.122 Local content opportunities arising from FLNG developments for WA's engineering and design; fabrication and manufacturing; and construction and ancillary services sectors are discussed throughout Chapters 4, 5 and 6.

261 Mr Roy Krzywosinski, Managing Director, Chevron, *Transcript of Evidence*, 24 October 2013, p 2.

262 *ibid*

263 Mr Ian Grose, Commercial Manager, East Browse, and Mr Stephen Phimister, General Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 7 and p 9.

264 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 2.

Interpreting local content data

3.123 Local content data is difficult to interpret and understand.²⁶⁵ Part of this difficulty centres around defining local content. Clearly, without knowing what has or has not been included in the definition of local content it is impossible to assess it in any meaningful way. This problem is exacerbated by the way in which local content is reported as an aggregate.

3.124 The following examples drawn from two House of Representatives committee reports on the North West Shelf project demonstrate not only the difficulty related to defining local content, but the importance of understanding the assumptions underpinning the data in question.

- It was estimated that when Phase III was completed there would have been approximately \$8,687 million of local content, which equates to 72%. However, this figure did not include the cost of constructing the LNG tanker, which was \$1,600 million, with 1 per cent Australian content. When this is included in the overall expenditure, Australian local content is reduced significantly to 61 per cent.
- The 74 per cent Australian content for Phases I and II included the \$322 million spent on development in Karratha.
- Woodside put the maximum possible Australian content for the whole project at 82 per cent. This figure includes Woodside management costs. If these are removed from the project cost, the local content for design, procurement, fabrication, installation and hookup is reduced from 65 to 59 per cent.
- The coating and fabrication of the pipeline was nominated as 100 per cent Australian content. However, this work was awarded to a joint venture between an Australian and a US firm.
- Design and project management for Phase III onshore facilities was estimated at 72 per cent. KJK in Perth was contracted for the design work for the Goodwyn related facilities. While 100 engineering and technical staff were required for this design work, Kaiser applied for a negotiated agreement with the federal government to have 33 overseas engineers on the project.²⁶⁶

265 Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 11; Standing Committee on Industry Science and Technology, *The North West Shelf. A sea of lost opportunities?* Parliament of the Commonwealth of Australia, Canberra, November 1989.

266 Standing Committee on Industry Science and Technology, *The North West Shelf. A sea of lost opportunities?* Parliament of the Commonwealth of Australia, Canberra, November 1989. These examples are taken from pp 33–41.

3.125 The *Sea of lost opportunities* report stated that such examples illustrate the ‘apparent unreliability of Australian content figures’ and that using overall figures ‘does not permit identification of the specific categories of work in which Australian industry is, or more importantly, is not gaining work.’²⁶⁷ That report argued that the ‘ambiguities and inconsistencies [*sic*] surrounding many of the aggregate figures... quoted for Australian content’ demonstrate that a ‘sound and consistent methodology needs to be developed to provide a basis for defining and monitoring Australian content in resource development projects.’²⁶⁸

3.126 This 1989 report called for a methodology that would:

*provide disaggregated information on Australian content in specific and separate sub-categories such as materials, equipment, project management, engineering design, fabrication, installation, maintenance, and operational costs for each sub-component of the project... this information should be sufficiently detailed and disaggregated to permit the identification of Australian content in specific items such as equipment and materials, and specific functions such as conceptual design.*²⁶⁹

3.127 Noting various industry attempts to define local content, the 1998 *Sea of indifference* report also concluded that ‘assessing whether the level of local industry participation in the NWS project is high, low or in between has been made difficult by the lack of independent, systematic monitoring and the lack of an agreed methodology.’²⁷⁰

3.128 That report also noted that reporting local content in aggregate can be misleading without further analysis as it does not provide information on the nature of contracts awarded to Australian industry which, in turn, does not allow analysis of ‘possible lost opportunities, that is, areas where local firms had the ability to supply goods and services.’²⁷¹

3.129 The 1998 report also expressed concern about Woodside’s definition of local content participation as ‘the calculated level of participation for those items that could be

267 Standing Committee on Industry Science and Technology, *The North West Shelf. A sea of lost opportunities?* Parliament of the Commonwealth of Australia, Canberra, November 1989, p 39 and p 33.

268 *ibid*, p 42.

269 *ibid*, p 42.

270 Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 13.

271 *ibid*.

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procured or undertaken in Australia.’²⁷² Local content under this definition clearly depends on what Woodside considers Australian companies to be capable of supplying. Citing examples of this practice, the 1998 report stated:

*one interpretation of the above information is that, once goods and services not able to be provided from Australian sources are removed from the value of the work, items remaining make up the total, out of which real Australian participation is then measured.*²⁷³

- 3.130 Participation rates as reported, then, would be quite different from the proportion of a project’s actual work carried out by Australian companies.
- 3.131 In March 2014, Woodside advised this Committee, the Economics and Industry Standing Committee, that the company estimates the local content relative to where the work is done.²⁷⁴
- 3.132 There are further difficulties associated with measuring local content. For example, should local content be measured as a proportion of total project costs or of contracts over a certain value? Currently in Western Australia, companies report contracts over \$100,000. Should it include the overseas content imported by Australian successful tenderers?
- 3.133 Unless readers of local content data have an appreciation of the assumptions and limitations relating to that data, interpretation is inherently risky.
- 3.134 The 1998 report warned that ‘Australia should not be complacent about the levels of industry participation,’ that it would have been more reassuring to have ‘up-to-date, independently gathered verification of content levels’ and that it ‘was essential that a methodology for measuring local content be agreed and a program of appropriate monitoring be implemented.’²⁷⁵

Local content reporting in Western Australia

- 3.135 Under the majority of State Agreements, companies have local content reporting obligations.²⁷⁶ In 2005, the Auditor General of Western Australia reported his:

272 Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 14 and p 15.

273 *ibid*, p 15.

274 Ms Paula Hickey, Woodside Energy Ltd, Electronic Mail, 4 March 2014, p 1.

275 Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998, p 22.

276 Auditor General for Western Australia, *Developing the state: The management of State Agreement Acts*, Office of the Auditor General, Perth, June 2004, p 19.

*concerns about lack of clarity as to what constituted local content, variations in the format of reporting, variations in the period of reporting, and failure to respond to the reports to the extent that some companies had ceased to produce reports because they were not acknowledged.*²⁷⁷

- 3.136 The Auditor General found that the department then responsible for administering State Agreements had not 'methodically monitored how well companies discharge Agreement obligations to maximise the use of local labour, services and materials.'²⁷⁸ This made it 'difficult to demonstrate how effective Agreements have been in encouraging companies to maximise the use of local content.'²⁷⁹
- 3.137 Given those concerns, under the direction of the then Minister for Energy, Resources and Industry, Hon Fran Logan, MLA, DCom assumed responsibility for local content reporting.²⁸⁰ DCom then worked with companies to develop a definition of local content, an understanding of reporting requirements, a format and reporting period, all of which were common to companies and the agency.²⁸¹
- 3.138 These difficulties help explain the absence of some data in Table 3.3 above.
- 3.139 In WA, DCom relies on company reports for its local content reports. The generally accepted definition of local content required for reporting under Western Australian agreements is 'the percentage or value portion of the contract that is generated within the boundaries of the state.'²⁸²
- 3.140 DCom provides project proponents with guidelines and advice on preparing local content reports. As well as defining local content, these guidelines include the following:

Local Content refers to the value of work that is carried out in Western Australia or Australia. This figure includes all material charges, labour costs, transport and profit margins.

Where contracts involve orders placed with companies overseas offices or agents the 'local' content should be assessed relative to where the work was actually done and where the main materials were sourced

277 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 2.

278 Auditor General for Western Australia, *Developing the state: The management of State Agreement Acts*, Office of the Auditor General, Perth, June 2004, p 4.

279 *ibid.*

280 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 2.

281 *ibid.*, pp 2–3.

282 *ibid.*, p 2.

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*rather than where the order was placed (i.e. If a contract is awarded to a Western Australian based company and that company sources materials from overseas but assembles in Western Australia, then only the assembly component will be reported as local content).*²⁸³

3.141 Mr Stephen Grocott of DCom advised that there was now a ‘generally accepted and understood working definition of “local content”’ and given the amount of time and effort the Department had spent with project proponents so they could structure their financial management and contract management systems, and their tender documentation, he would be ‘disappointed to discover otherwise.’²⁸⁴

3.142 An example of the difficulty in determining local content for projects is provided by the recent media announcement *Perth firm gets Prelude work*. This article reported that:

*Shell has started to make good on its promise that using floating technology to develop the Browse gas field would create local jobs, announcing last night that 80 workers would be needed to build support vessels for the Prelude project.*²⁸⁵

3.143 However, the three tugs included in the contract to supply and operate support vessels for Prelude will not be built in Australia. Rather they will be built in Asia and the 80 staff will be operational staff such as mariners. In relation to local content for this contract, Mr Grocott stated that:

*the value of local content would be the proportion of the contract, by value, which is performed within Western Australia. So certainly... it would not include the construction of the tugs or the design of the tugs.*²⁸⁶

3.144 Following the delivery and commissioning of the tugs, it is the crewing and the support to the tugs that legitimately can be referred to as local content. DCom advised that following the newspaper article it contacted KT Maritime Services to find out the process by which they were awarded the contract and the idea of the tugs being a commitment to local content. As DCom explained:

Within half an hour of talking to the company, we [DCom] got an email from Shell saying, ‘Please don’t contact the companies that have been awarded contracts by ourselves; please enter into dialogue with us.’

283 Department of Commerce, *Guidelines and advice on preparing local content reports to proponents of state development projects*, Government of Western Australia, p 1.

284 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 3.

285 Harvey, Ben, *Perth firm gets Prelude work*, *The West Australian*, Perth, 12 February 2014, p 6.

286 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 4.

*We said, 'Okay; fine. We'll do that, and here's what we'd like to know' and they said, 'We'll get back to you next week.'*²⁸⁷

- 3.145 DCom has produced Local Content Reports since 2010. These reports are published in May and November of each year and provide cumulative data on what has been spent by companies that are required to report their local content expenditure. Because of the often considerable time delays in reporting, which can be up to fifteen months during a project's operational phase, DCom regards its Local Content Reports as 'macro indicators and nothing else,' revealing general trends and allowing informal benchmarking against targets for specific industries. For example, targets of 75 to 85 per cent are anticipated for iron ore projects and 45 to 55 per cent for the construction phase of an offshore oil and gas project.²⁸⁸
- 3.146 Mr Grocott advised that the Department currently receives reports from 24 active projects covered by State Agreement Acts and that, 'by and large everyone is reporting and they are reporting on time.'²⁸⁹ Mr Grocott advised that there were benchmarks against which company reports were assessed and part of the Department's monitoring process is to query 'an unrealistically low or high level of content against a particular contract' or 'why a contract has been awarded in the eastern states or overseas.'²⁹⁰
- 3.147 State Agreements do not provide for any penalty for companies that fail to exhibit any commitment to local content. On the rare occasion that happens, DCom 'rel[ies] on persuasion and, if necessary, the Premier' as Minister for State Development contacts the company to advise they need to demonstrate their commitment to providing full, fair and reasonable opportunity for local industry participation.²⁹¹
- 3.148 The Committee was concerned that the Local Content Reports were providing data simply to meet reporting requirements, rather than provide in-depth analysis and assistance to government and local business.
- 3.149 During a hearing, though, Mr Grocott spoke of the need to go beyond the Local Content Reports, stating that there had been 'something of an obsession with a single KPI, which is the level of local content during the construction phase.'²⁹² DCom reports have been amended to try to provide an improved picture of the net benefit of a

287 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 5.

288 *ibid*, p 3.

289 *ibid*, p 5.

290 *ibid*.

291 *ibid*, p 4.

292 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 3.

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project by accounting for benefits in addition to direct participation, including research and development, community grants and Indigenous business support.²⁹³

3.151 While the Committee is pleased with this development, it will take time for the benefits of this approach to reporting to become apparent.

Importance of local content for LNG developments in Western Australia

3.151 The following summarises the current situation as a way of emphasising the importance of local content to the Western Australian economy and local industries.²⁹⁴

3.152 Currently, of the 31 LNG liquefaction plants operating in the world, three of them are in Australia. One of these, ConocoPhillips' Darwin LNG project, is in the Northern Territory, while two are in WA, namely the North West Shelf and Pluto projects, both operated by Woodside.²⁹⁵

3.153 There are also 13 LNG plants currently being constructed around the world, with seven of them in Australia. Four of these are of direct relevance to Western Australia:

- Chevron's land-based Gorgon and Wheatstone projects;
- INPEX's Ichthys project, which will pipe gas to Darwin; and
- Shell's Prelude project, which will be developed using FLNG.²⁹⁶

3.154 As well as projects either currently operating or being constructed, there are a number of projects under consideration which, if developed, will have a potentially significant impact on Western Australia. These include the Browse LNG, Scarborough, Gorgon expansion, Wheatstone expansion and Bonaparte FLNG projects. Of these, Browse, Scarborough and Bonaparte are being considered as FLNG projects.²⁹⁷

3.155 With 20.8 million tonnes of LNG produced in Australia in 2011, seven greenfield projects under construction Australia-wide and a dramatic rise predicted in Australian

293 *ibid*, p 3.

294 Further background information is contained in Volume 2 of this report.

295 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 6; Submission No. 19 from INPEX Operations Australia Pty Ltd, 30 August 2013, p 5; Ms Gail McGowan, Deputy Director General, Department of State Development, *Transcript of Briefing*, 16 June 2013, p 3; and Mr Damian Dwyer, Director, Economics, Australian Petroleum Production and Exploration Association Ltd, *Transcript of Briefing*, 16 June 2013, p 3. The North West Shelf project has been operating for 26 years.

296 The three additional projects are on Curtis Island in Queensland. Submission No. 19 from INPEX Operations Australia Pty Ltd, 30 August 2013, p 5; Submission No. 28 from Engineers Australia, Western Australia Division, 14 October 2013, p 1.

297 Mr Damian Dwyer, Director, Economics, Australian Petroleum Production and Exploration Association Ltd, *Transcript of Briefing*, 16 June 2013, p 3. See also submissions from Shell Australia (No. 15), Woodside Energy Ltd (No. 24), Santos Ltd (No. 29) and GDF SUEZ Bonaparte Pty Ltd (No. 30).

LNG sales in the relatively near future, Australia is well placed to become the number one LNG producer in the world by 2020 and potentially be producing 25 per cent of the world's LNG by 2030.²⁹⁸

3.156 McKinsey and Company calculated that if all currently planned and speculative projects are realised it would increase capital expenditure investment by over \$180 billion, add \$320 billion to the Australian economy, increase GDP by 1.5 per cent, create 150,000 new jobs and add \$5 billion to taxation revenue over 2015–2025.²⁹⁹

3.157 CMEWA also noted the value of the resources sector to the economy. It submitted that while investment in resource projects had slowed over the previous year, there was still \$141.7 billion committed to Western Australian projects as at 30 April 2013, with approximately \$80 billion of projects also awaiting final investment decision (FID).³⁰⁰ Seventy four per cent of the committed projects and 33 per cent of the proposed projects are petroleum projects.³⁰¹

3.158 It is essential that Western Australian businesses, as current and prospective employers, obtain maximum benefit from current and prospective resource projects through providing local content.

Relevance of initiatives for local content for FLNG facilities

3.159 Just how relevant federal and state local content initiatives are in relation to FLNG projects is uncertain. Unions are concerned that it may not be necessary for Australian labour to be used on FLNG facilities. Certainly, state policies are not expected to apply to FLNG projects developed in Australian territorial seas.

3.160 ExxonMobil advised that it 'would embrace the opportunity to use Australian resources for these projects.'³⁰² In discussing FLNG as a 'new and innovative' technology, Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), stated that Australia has the opportunity to develop experience in this area, and that the company's:

298 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 6; Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 9; and Submission No. 12 from Australian Petroleum Production and Exploration Association Ltd, 30 August 2013, p 29.

299 Ellis, Michael, Heyning, Christiaan, and Legrand, Olivier, *Extending the LNG boom: Improving Australian LNG productivity and competitiveness*, McKinsey & Company, Australia, May 2013, p 4. This report was cited in several submissions to this Inquiry, including those from Shell Australia, The Chamber of Minerals and Energy of Western Australia (Inc), Australian Petroleum Production and Exploration Association Ltd, and Santos Ltd.

300 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 5.

301 *ibid*, p 6.

302 Mr Luke Musgrave, Vice President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, p 8.

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*local content policy would be that in tendering, making work available, we will include Australian companies in the opportunity list of companies available to tender for work and work with organisations like the ICN and others to ensure that Australian contractors and industry are aware and have the opportunities.*³⁰³

- 3.161 As Chapters 4, 5 and 6 demonstrate, there are inherent problems for Australian companies being able to tender for work, including access to global supply chains and tender pre-qualification.
- 3.162 DCom advised that, as well as being a member of local content steering committees for the Gorgon and Wheatstone projects, the Department is a member of the steering committee for the Browse project.³⁰⁴ Mr Stephen Grocott, DCom, chairs the Browse committee which, to date, has met six times.³⁰⁵
- 3.163 DSD is also a member of the Browse steering committee and is 'the lead agency on coordination and planning issues; DCom is 'the lead agency on local content issues.'³⁰⁶ According to DCom, 'if there are questions about the potential loss [of local content for Browse] then really, at the end of the day, that is our [DCom] remit rather than theirs [DSD].'³⁰⁷ The State's Lead Agency Framework is discussed in Chapter 13, Volume 2.
- 3.164 As Woodside is now in the BOD phase for a Browse FLNG option, details such as local content reporting are yet to be finalised. DCom advised that Woodside had recently advised the Minister that it was 'looking forward to working with the department on local content issues through the committee, including with writing reports.'³⁰⁸
- 3.165 DCom advised that the Department had been in discussions with Shell in relation to establishing a Prelude round table and had, in fact, been through 'quite an extensive series of meetings to establish terms of reference and membership.'³⁰⁹
- 3.166 Shell advised the Committee that it was 'participating in the local content round table with government to try to look to where there are further opportunities for Australian industry to participate in projects.'³¹⁰

303 *ibid.*

304 While Wheatstone is not subject to a State Agreement it is reporting on local content. The Gorgon Local Content Steering Committee meets quarterly and formally considers its local content report.

305 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 5 and p 12.

306 *ibid*, p 12.

307 *ibid.*

308 *ibid*, p 5.

309 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 4.

3.167 However, DCom advised that the suggestion by Shell that the local content round table is meeting 'is not factually correct' and that Shell have advised that it is 'on hold due to staff shortages'.³¹¹ In discussing the previously mentioned contract for three support vessels for Prelude, Dcom advised that it was 'not across Shell's local content approach on Prelude' and that 'basically, the communication between ourselves and Shell ceased in about September last year'.³¹²

3.168 Because Prelude will be developing a field in Commonwealth waters it is not subject to a State Agreement or State Development Agreement. According to DCom, the federal government 'has not exactly been active on the issue of Australian industry participation in FLNG'.³¹³

Finding 21

Western Australian local content policies may not provide maximum opportunities for local businesses to participate in FLNG projects.

Recommendation 11

As a matter of priority, the Minister for Commerce review and amend Western Australia's local content policies to ensure their relevance to FLNG developments in coastal waters.

Finding 22

Despite government implementation and monitoring of local content provisions in State Agreements, local businesses still do not have full, fair and reasonable opportunity to participate in these major projects.

Recommendation 12

The Western Australian Government clarify and detail the reporting requirements for State Agreements, and ensure that reporting is through a transparent process to Parliament.

Recommendation 13

The Western Australian Government ensure that through its Lead Agency Framework one agency, from a project's earliest concept development through to its implementation, works to maximise the opportunities for the state. This would include coordination with the Commonwealth Government.

310 Mr Ian Grose, Commercial Manager, East Browse, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p13.

311 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 5.

312 *ibid*, pp 5–6.

313 *ibid*, p 5.

Approaches taken by other countries

3.169 Other countries also have policies aimed at increasing local content in major investment projects. According to DCom, ‘approaches vary from intervention through state ownership and mandating of levels and forms of local content, to reliance on market forces underpinned by an opportunity to compete subject to commercial viability tests.’³¹⁴

3.170 A major oil and gas engineering company in Perth advised the Committee that in other jurisdictions in the world they are commonly required ‘to have certain facilities to achieve a level of local content.’³¹⁵ Furthermore, it is certainly the case that if companies want to operate in other countries with specific local content provisions, not only will companies have to abide with them, they will.³¹⁶

3.171 The Department’s analysis of the local content policies and processes in five overseas jurisdictions—Canada, Russia, Nigeria, Norway and the UK—revealed the following.

3.172 First:

*there is a correlation between the type of policies adopted and the economic conditions in a country or region. Low-income countries and developed economies with weak growth records tend towards greater direct levels of involvement. Countries in this category include Nigeria and the Canadian province of Newfoundland and Labrador.*³¹⁷

3.173 Second:

*policies are also influenced by whether the domestic supply industry is emerging or mature. In Russia and Georgia with an emerging petroleum industry, high levels of prescription operate in the form of State owned companies seeking to foster the growth of local supply.*³¹⁸

3.174 DCom’s study also indicated that prescriptive policies had not resulted in ‘significantly higher levels of local content than those achieved to date in Western Australia (under the AIP National Framework).’³¹⁹ Instead, it found that ‘the degree of *political*

314 Department of Commerce, *Local content report*, Government of Western Australia, Perth, May 2011, p 16. Note: The Explanatory Memorandum for the Australian Jobs Bill 2013 draws heavily on the Department of Commerce’s analysis. See pp 19–20.

315 Closed hearing, *Transcript of Evidence*, 26 February 2014, p 6.

316 Closed hearing, *Transcript of Evidence*, 26 February 2014, p 10.

317 Department of Commerce, *Local content report*, Government of Western Australia, Perth, May 2011, p 16.

318 *ibid.*

319 *ibid.*

encouragement exerted to ensure project proponents focus on this issue’ was a ‘stronger influence.’³²⁰

3.175 The following summarises the findings of the DCom’s 2008 study as detailed in the May 2011 Local Contents Report.

Canada—Newfoundland and Labrador province

3.176 Under the *Newfoundland Provincial Accord Act* and the *Canadian Federal Accord Act*, prior to ‘exploration or development of an oil field, proponents must obtain approval of the Canada-Newfoundland and Labrador Offshore Petroleum Board to a benefits plan.’³²¹ The Hebron Project Agreement is one such approved benefits plan. See the case study below.

3.177 DCom found similarities in the Newfoundland–Labrador and Western Australian approaches. For example, ‘both jurisdictions emphasise a full opportunity for local industry participation subject to commercial viability as a benchmark for awarding contracts.’³²²

3.178 There are also contrasts between the two approaches:

- *the Provincial Government has taken an equity share in energy projects to influence decision-making,*
- *the very close working relationship between Canada’s Federal and Provincial Governments on local industry participation in offshore projects,*
- *and the high degree of scrutiny applied to contracts.*³²³

Norway

3.179 Prior to 1994, when Norway joined a number of international agreements, it had ‘used extensive state intervention and ownership to support local industries,’ thus implementing policies ‘that increased local content and led to the emergence of a globally competitive energy service sector.’³²⁴

320 *ibid.* Emphasis added.

321 *ibid.*

322 *ibid.*

323 *ibid.*

324 *ibid.*, p 17–18. Such international agreements include the European Economic Area and the World Trade Organisation.

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3.180 By that time, Norway's objective of 'allowing Norway to develop Statoil and its indigenous energy service companies to a point where they could compete globally' had been achieved through the following:

- Norway's Petroleum Law which facilitated the government selecting international oil companies that would work to maximise local benefits;
- the requirement for government equity participation in offshore development;
- preferencing two state-owned companies, Statoil and Norsk Hydro, in licensing decisions;
- Article 54 of the Royal Decree mandated the preferential treatment of Norwegian goods and services, providing they were competitive 'on price, quality, schedule and service';
- Norway's preferential policy for knowledge transfer and research cooperation, which mandated that international oil companies transfer skills and competence to domestic companies; and
- the establishment of a Goods and Services Office as a 'watchdog agency' with a number of functions relating to controlling and monitoring of contracting and procurement targets and procedures.³²⁵

3.181 Since then, due to its obligations to tighter competition rules and the 'national treatment' principle, which dictates that foreign and domestic companies receive the same treatment, Norway's direct intervention has significantly reduced. Nevertheless, as stated above, by this time Norway's protectionist policies has allowed it to establish globally competitive domestic energy service companies.³²⁶

Russia

3.182 According to DCom, the Russian government 'acts as an oil explorer, developer, transporter and regulator' and has a 'de facto monopoly on oil and gas.'³²⁷ This is achieved through State control of Gazprom, an oil and gas producer controlling 16% of the world's oil equivalent reserves, and State ownership of Transneft, which owns the largest oil pipeline system in the world.³²⁸

3.183 The production sharing agreements in place for the Sakhalin 1, Sakhalin 2 and Kharyaga projects 'divide the resources produced between the State and investors and usually

325 *ibid.*

326 *ibid.*

327 *ibid.*, pp 18–19.

328 *ibid.*

require 70% local content for equipment and 80% for labour.³²⁹ However, these unpublished agreements do not contain a timeframe or a definition for local content.

3.184 Two broad strategies are employed by companies operating in Russia to achieve high local content levels:

- ‘price preferencing,’ with local companies being preferred over foreign firms even if the latter can propose prices up to between 7.5% and 15% lower; and
- modifying the ‘procurement policy’ to make it simpler, cheaper and more accessible for local small and medium enterprises through capacity building, increased standardisation, design, database creation and information dissemination.³³⁰

Nigeria

3.185 The *Nigerian Content Development Bill 2003* set local content targets of 45 per cent and 70 per cent by 2006 and 2010 respectively. Local content is defined as the value added by using Nigerian materials and labour in the upstream sector of the Nigerian petroleum industry, including ‘all activities connected with the exploration, development, exploitation, transportation and sale of Nigeria Crude Oil and Gas Resources.’³³¹

3.186 The *Nigerian Oil and Gas Industry Content Development Act 2010* is intended to improve local content in all aspects of oil operations and contains provisions ‘specifying minimum amounts of local materials and personnel used by oil and gas operators in the country.’³³² For example:

- 65% of divers in energy projects must be Nigerian;
- 60% of steel ropes must be made locally;
- all contracts awarded in excess of US\$100 million include a ‘labour clause’ mandating the use of a minimum percentage of Nigerian labour or the use of indigenous companies of a minimum size.³³³

3.187 The Nigerian Content Development and Monitoring Board guides, monitors, coordinates and implements the provisions of the *Nigerian Oil and Gas Industry Content Development Act 2010*.

3.188 DCom states that the ‘Nigerian Content Division has been quite successful in ensuring compliance with local content regulation, in providing financial support to help local

329 *ibid.*

330 *ibid.*

331 *ibid.*, p 19.

332 *ibid.*

333 *ibid.*, p 19.

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companies bidding for contracts and in coordinating local capacities.’³³⁴ DCom also notes that local content levels are constrained by ‘limited infrastructure, a small industrial base, high project costs, a high interest rate and skills shortages.’³³⁵

3.189 Industry experts estimate that local content in the Nigerian oil and gas sector is around 40 per cent. Foreign workers and overseas suppliers provide most white-collar jobs, engineering, materials and maintenance work. Nigeria, as a developing nation, provides little relevant information for Western Australia, in particular in terms of international obligations, cost structures and skills availability.³³⁶

3.190 Furthermore, though 40 per cent is the estimated local content achieved in the Nigerian oil and gas sector, it is difficult to obtain definitive information from Nigeria in relation to its local content levels. While international oil companies seem willing to comply with Nigeria’s local content requirements, they ‘have questioned whether targets are either realisable or desirable.’³³⁷

United Kingdom

3.191 In developing its North Sea oil fields, the United Kingdom government successfully implemented measures that increased local content in the ‘North Sea oil sector from 30% in 1973 to 82% by 1986, with nearly 100% local content in post-development operations.’³³⁸ The measures adopted include:

- *Discretionary licensing, rather than auctions;*
- *Auditing oil company purchases;*
- *Providing domestic supplies with financial assistance;*
- *creating the Offshore Supplies Office ‘to develop the industry’s competitiveness, develop R&D initiatives and advise on joint ventures with established operators’;*
- *Strict audit procedures ‘to ensure full and fair opportunities for domestic suppliers’;*
- *Ensuring that the ‘focus of local content requirements was on creating high value addition, rather than mere local incorporation, low levels of transformation or local ownership’; and*

334 *ibid.*

335 *ibid.*

336 *ibid.*

337 *ibid.*

338 WTI Advisory Group, *Local content requirements and the green economy*, UNCTAD, Geneva, June 2013, p 16.

- *'Firm-level sanctions for a lack of local content development were largely of the 'soft' kind—i.e. difficulty in future bidding rounds—rather than legal mandates, prosecutions or fines.'*³³⁹

3.192 The United Kingdom government's successful implementation of this strategy was based on the already 'well-established industrial base and highly trained and educated workforce, with a high level of technical competence in manufacturing, shipbuilding and engineering.'³⁴⁰

3.193 After the formation of the European Union in 1993, the United Kingdom was not able to exercise any local content provisions. This resulted in a reduction of local content levels to 60–70 per cent. While some local content strategies remain at the local authority level, the United Kingdom government subsequently 'changed its focus to supporting private investors to develop export markets in a competitive environment.'³⁴¹

339 WTI Advisory Group, *Local content requirements and the green economy*, UNCTAD, Geneva, June 2013, p 16; Department of Commerce, *Local content report*, Government of Western Australia, Perth, May 2011, p 19.

340 WTI Advisory Group, *Local content requirements and the green economy*, UNCTAD, Geneva, June 2013, p 16.

341 Department of Commerce, *Local content report*, Government of Western Australia, Perth, May 2011, p 20.

Case Study: Canada–Newfoundland and Labrador Benefits Plan and Canada–Nova Scotia Benefits Plan³⁴²

Canada is often cited as an example of a country with an effective local content policy. The *Canada–Newfoundland Atlantic Accord Implementation Act* and the *Canada–Nova Scotia Offshore Petroleum Resources Accord Implementation Act* establish the statutory requirement that a Benefits Plan must be submitted and approved by the relevant Offshore Petroleum Board prior to the approval of a development plan.

The legislation established requirements by which it is intended to provide an opportunity for businesses and individuals in the Province, and elsewhere in Canada, to participate on a competitive basis.

Benefits Plans include requirements that:

- Contracts be identified which could be undertaken locally if commercially viable.
- Before carrying out any work or activity in the offshore area, the corporation or body submitting the plan shall establish in the Province an office with appropriate levels of decision-making.
- First consideration be given to goods manufactured in the Province and services provided from within the Province, where those goods and services are competitive in terms of price, quality and delivery.
- First consideration be given to individuals from the Province for training and employment.
- Expenditure is made for research and development to be carried out within the Province.
- Training and employment opportunities be provided for disadvantaged individuals or groups and enables businesses owned or operated by them to participate in the supply of goods and services.

The legislation requires that businesses in the province and other parts of Canada must have full and fair opportunity to participate on a competitive basis. In practice, this means that contracting procedures must not unfairly disadvantage local suppliers, but the project proponent must demonstrate that all reasonable efforts have been taken to ensure that local suppliers have been afforded an opportunity to participate in the procurement process on a competitive basis.

Any disputes must go to mediation, negotiation and eventually arbitration, with the arbitration decision being binding.

342 Explanatory Memorandum, Australian Jobs Bill 2013, (Commonwealth of Australia) and Department of Commerce, *Local content report*, Government of Western Australia, Perth, May 2011.

3.194 The following case study is included to demonstrate the potential for negative unintended consequences to result from local content policies.

Case Study: Alternate means of encouraging local content – Brazil³⁴³

Alternative options to encourage increased local industry participation are currently utilised by Brazil which, according to Dow Jones Newswires, has been imposing local content requirements on oil companies since 1999*. Brazil's policy requires a Concession Agreement for the exploration, development and production of oil and natural gas, including an agreed upon Local Investment Percentage for the project.

The article identified a study by Booz & Co., prepared for Brazil's National Petroleum Industry Organisation (ONIP) which found that Brazilian producers in the oil services industry charge 55% more than their international competitors. Booz & Co. attributed the gap in price as a result of a heavy tax burden, high borrowing costs and infrastructure bottlenecks. Dow Jones also reported that Petrobras (Brazilian state-owned oil giant) forecasts that, if limited to domestic suppliers, there will be no production growth in the next 3 years despite its 16.4 billion barrels oil-equivalent in proven resources. As reported in the Economist, local industry leaders justify local content rules as needed to promote industrial development[#]

Similar programs in other sectors of the country have also resulted in unintended negative consequences. For example, Brazil's local content requirement in its second phase PROINFINA program were partially intended to increase the use of Brazilian steel in large wind farm developments, but have instead resulted in the substitution of more cost-effective concrete made wind towers in larger projects.

* article reference: *Dow Jones Newswires*, 18 July 2012, 'Brazil local content policy inhibits oil development.

Eike Batista: The salesman of Brazil: Brazil's richest man is betting on resources and infrastructure. Can he deliver? *The Economist* (print edition) May 26th 2012.

Are we hungry enough?

3.195 The Committee understands that Scottish engineering companies are establishing themselves in WA and have reportedly increased their contracts in oil and gas projects by 31 per cent to \$1.35 billion over two years.³⁴⁴ These companies are actively supported by Scottish Development International (SDI), a joint venture with partnerships including the Scottish Government and various government economic, enterprise, innovation and investment agencies such as Scottish Enterprise.³⁴⁵

343 Explanatory Memorandum, Australian Jobs Bill 2013, (Commonwealth of Australia).

344 Macdonald, Kim, 'Great Scot! The oil, gas hopefuls are coming,' *The West Australian*, 18 February 2014, p 4.

345 Scottish Development International, *About Scottish development international*. Available at: <http://www.sdi.co.uk/about-us>. Accessed on 5 March 2014.

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3.196 As well as assisting foreign companies invest in Scotland, SDI also helps local Scottish enterprises expand in terms of international trade and global markets. SDI has 27 offices in 15 countries. SDI has indicated that it is focussing on Perth at present.³⁴⁶

3.197 DCom advised that it has 'very good links with SDI' and had recently met with the SDI representatives at the AMC.³⁴⁷ In response to a question about what the SDI and Scottish companies were doing right that WA does not do, DCom stated:

*they are hungrier. They have that alliance between industry, government and union. They have a track record of success. It boils down to hunger. It boils down to going out and chasing the market and being prepared to respond to whatever the market requires of them.*³⁴⁸

3.198 DCom also advised that when the Department has talked with Woodside about how they want to engage with small and medium local suppliers, Woodside responded:

*Give us an innovative solution to a problem. Do not expect us to come to you and say, 'We'll buy that.' Understand our business model. Understand our issues and then provide us with the response. Then we will be interested and then we will champion your cause within the company.*³⁴⁹

3.199 As the following chapters demonstrate, the opportunities for Western Australian suppliers to participate in FLNG are significantly reduced in comparison with their participation in onshore developments.

3.200 While Chapter 7 outlines some of the opportunities available to Western Australia from FLNG projects, the Committee intends to undertake further work on what opportunities might be available and how they might be generated. To this end, the Committee intends to examine in more detail the work being done in other jurisdictions and to make a separate report to Parliament on this matter.

346 *ibid.*

347 Mr John O'Hare, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 11.

348 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 10.

349 *ibid.*

Chapter 4

The impact of FLNG on Western Australia's engineering and design sector

There is a strong link between the project design base and the project's local content... procurement goes hand in hand with engineering... it is difficult to get local content with overseas design, and to get Australian content the engineering needs to be done locally.

The potential for the development of a centre of excellence in LNG industry design in Western Australia³⁵⁰

Introduction

- 4.1 Chapter 4 is the first of three that consider the impact of FLNG technology on various sectors of the Western Australian economy. This chapter is concerned with the impact on the engineering and design sector. Chapters 5 and 6 discuss the impact on the fabrication and manufacturing, and the construction and ancillary services sectors, respectively.
- 4.2 This chapter begins with some general comments on the difficulty in predicting the impact of the shift toward developing gas fields using FLNG technology. These comments equally apply to Chapters 5 and 6.
- 4.3 The balance of Chapter 4 addresses both the perceived threat that FLNG poses to Western Australian design-phase engineering and the potential opportunities for particular sections of the engineering sector. To do this, it first discusses the decline in opportunities for local engineers in LNG plant design projects that is largely due to the industry-wide shift to using Engineering, Procurement and Construction Management (EPCM) contractual arrangements for these projects. The importance of local design engineering is demonstrated through consideration of project problems that arise when local conditions are not factored into engineering design. The direct connection between the engagement of local design-phase engineers and the level of local content in the manufacturing and construction phases of LNG plant projects is also discussed.
- 4.4 This chapter concludes with a brief discussion of the potential for Perth to become an engineering design hub or centre of excellence.³⁵¹

350 Economics and Industry Standing Committee, *The potential for the development of a centre of excellence in LNG industry design in Western Australia*, Parliament of Western Australia, 2010, p 8.

A massive undertaking

- 4.5 Offshore gas projects tend to be massive and complex projects. Chevron's Gorgon project, the largest LNG project undertaken in the world, exemplifies the difficulty in making accurate predictions of project requirements.
- 4.6 In a statement on 11 December 2013, Chevron Corporation revealed that the cost estimate for the first phase of its flagship Gorgon LNG project—which at that point was almost 75 per cent complete—had risen to \$US54 billion.³⁵² In September 2009, when a positive final investment decision (FID) on the project was taken, the estimated development cost was \$US37 billion.³⁵³
- 4.7 The announced cost overrun was not unexpected. Chevron Australia's Managing Director, Mr Roy Krzywosinski, informed the Committee that since the project's inception it had been adversely affected by various logistical issues that impacted upon productivity:
- We got the infrastructure in place, what we call a fly camp or a construction village, started mobilising people, anticipating that we were going to have the material to feed the workers so they can actually start completing their work scopes. What we found is that it was just much more difficult to get what we would call the tonnage and the volume of material up to the island to feed the workforce so that they could be productive. As a result we had some logistics issues impact the productivity in the whole project.*³⁵⁴
- 4.8 While the scale of the Gorgon project is unprecedented, projects such as Chevron's Wheatstone, INPEX's Ichthys and Woodside's proposed Browse are also large and complex. Clearly, accurately forecasting the requirements for LNG projects is a difficult task. Given that the new FLNG technology represents a paradigm shift in LNG development, it is reasonable to assume that accurate forecasts for projects such as Prelude could be just as difficult to achieve.
- 4.9 This situation is exacerbated by the fact that no two projects are alike and making direct comparisons often does not generate useful data. Furthermore, as noted in the

351 Opportunities arising from FLNG are discussed in more detail in Chapter 7.

352 Macdonald-Smith, Angela, 'Chevron's Gorgon LNG costs climb to \$US54bn,' *The Australian Financial Review*, 13 December 2013, p 15.

353 *Gorgon Go-Ahead Heralds a New Frontier for Australian Gas Development*, Media Statement, Chevron Australia, 14 September 2009. Available at: http://chevron.vividcluster.crox.net.au/media/mediastatements/09-09-14/Gorgon_Go-Ahead_Heralds_a_New_Frontier_for_Australian_Gas_Development.aspx?NewsPageID=13. Accessed on 17 January 2014.

354 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 6.

introduction to this report, the commercial-in-confidence nature of industry forecasts meant that information was either not provided to the Inquiry, or not able to be disclosed by the Committee.

- 4.10 Given these factors, it is also extremely difficult for the Committee to publicly and openly determine and quantify the impact on the WA economy of the shift to FLNG projects generally, or on a project-by-project basis. Under these circumstances, reporting accurate, specific impact figures is limited.
- 4.11 Proponents of the technology consistently advanced the argument that FLNG would provide a net benefit to the economy. Critics, on the other hand, suggested that the use of FLNG technology to develop WA gas reserves would have a direct and adverse effect on each of the economic sectors included within the Inquiry's terms of reference.
- 4.12 Therefore, while the Committee has not been able to quantify the impact of FLNG developments, the ramifications FLNG technology might have for the engineering and design, manufacturing and fabrication, and construction and ancillary services sectors of the Western Australian economy have been further explored in the following sections. It is anticipated that this will allow the Western Australian Government to engage with the federal government and to develop strategies and policy settings to achieve maximum benefit for Australia from all LNG developments.

The design process and the shift to EPCMs

- 4.13 Once a gas field has been identified for an LNG project, work begins on the concept/visualisation phase, which identifies various development options, undertakes initial cost estimates and allows a decision to be made as to whether to proceed with project development.³⁵⁵ It is not uncommon for this phase to be the subject of a competitive tender process.
- 4.14 Following this initial phase is the front end engineering design (FEED) stage, which analyses the various options and provides a clearer project definition. The FEED phase includes pre-feasibility, feasibility and bankable feasibility studies. It is during the FEED phase that 'an engineering solution is developed with sufficient detail to enable a ± 20 per cent cost estimate to be established,' the project schedule is developed more fully and commercial contracts may be prepared.³⁵⁶
- 4.15 Dr Martin West has noted that resource companies are increasingly using EPCM contracting arrangements for large-scale industrial projects.³⁵⁷ An EPCM contract is 'a

355 Department of Commerce, *Assessment of the engineering design capability and capacity in the oil and gas sector in Western Australia*, report prepared by Dr Martin West, Government of Western Australia, Perth, September 2011, p iv.

356 *ibid.*

357 *ibid.*, p v.

Chapter 4

sophisticated project management or agency arrangement,³⁵⁸ under which the principal engages an EPCM contractor to ‘manage the design and construction process on behalf of the Client in a professional services capacity.’³⁵⁹

4.16 According to Australian law firm Minter Ellison, under such an arrangement, an EPCM contractor:

- *is responsible for the detailed engineering and design for the project*
- *manages the project as the principal’s agent or representative, including providing programming and strategic management services, and*
- *is typically responsible for breaking down the procurement and construction work into packages, managing their tender, overseeing the principal’s entry into the trade/supply contracts and managing those trade/supply contracts for the principal to ensure completion of the project.*³⁶⁰

4.17 Although seemingly similar, EPCM contracts differ markedly from engineering, procurement and construction (EPC) contracts. Where an EPC contractor undertakes responsibility for the design, procurement and ultimate construction of a project, an EPCM contractor oversees the project to completion without directly undertaking any of the construction work.³⁶¹

4.18 Commenting on the difference between the two models, international law firm Herbert Smith Freehills observed that:

in the current global economic uncertainty, [the EPC] model has continued to flourish where contractors are keen for work and are therefore prepared to accept a risk profile which benefits the Client and is bankable to financiers. However, where the pool of contractors actually capable of undertaking the sort of mega-projects associated with the petrochemical, oil and gas and mining sector is small and becoming more so following consolidation amongst project

358 Minter Ellison, *Demystifying EPCM contracts—What’s in an ‘M’?*, 29 April 2011. Available at: http://www.minterellison.com/a_201104_osc/. Accessed on 22 January 2014.

359 Herbert Smith Freehills, *EPCM Contracts: A more sophisticated procurement methodology?*, June 2012. Available at: <http://www.herbertsmithfreehills.com/-/media/HS/T-290612-6.pdf>. Accessed on 22 January 2014.

360 Minter Ellison, *Demystifying EPCM contracts—What’s in an ‘M’?*, 29 April 2011. Available at: http://www.minterellison.com/a_201104_osc/. Accessed on 22 January 2014.

361 Herbert Smith Freehills, *EPCM Contracts: A more sophisticated procurement methodology?*, June 2012. Available at: <http://www.herbertsmithfreehills.com/-/media/HS/T-290612-6.pdf>. Accessed on 22 January 2014.

*participants, the negotiating position of contractors is becoming stronger.*³⁶²

4.19 In effect, the EPCM model is a risk-spreading strategy. Under an EPC arrangement, the central contractor assumes all risk and provides a single point of responsibility for the project, which is procured under a fixed-price and date-certain contract. Petroleum projects are generally of such significant scale and complexity, however, that very few if any EPC contractors are willing—or indeed able—to act as a single point of responsibility. Furthermore, allowing a central contractor to assume full project risk is in itself a significant risk for the project proponent. In effect, as a more flexible contracting strategy, EPCM arrangements give project proponents a greater role in assuming and allocating project risk.³⁶³

The decline of engineering design in Australia

4.20 There has been a marked decline in participation by locally-based engineers in design work for LNG projects since train 4 of the North West Shelf Joint Venture was designed and engineered in Australia. This decline coincides with the rise of global EPCMs over the course of the past ten years.

4.21 To demonstrate this, the following briefly outlines the expansion of the North West Shelf gas plant since the turn of the century.

4.22 In 2000, the North West Shelf gas plant consisted of three LNG trains, each with the capacity to produce 2.5 million tonnes of LNG per annum (mtpa), for a total production capacity of 7.5 mtpa. Plans to expand this capacity were announced in 2000, and in April 2001 a \$280 million contract to design and install a fourth, more efficient (4.4 mtpa) train was awarded to Kellogg Joint Venture (KJV). This Perth-based consortium was comprised of Halliburton Australia, Hatch-Kaiser Engineers, Clough Engineering and JGC Corporation. Engineering for this expansion project was undertaken by a team of 350 Perth-based engineers—the first time that a new LNG plant anywhere in the world had been designed in its country of origin.³⁶⁴

4.23 Train 4 produced its first LNG in 2004. In 2005 a further expansion in plant production capacity, consisting of the addition of a fifth train, was initiated. As train 5 was to be a replica of train 4, there was some expectation that KJV would again be engaged on this

362 Herbert Smith Freehills, *EPCM Contracts: a more sophisticated procurement methodology?*, June 2012. Available at: <http://www.herbertysmithfreehills.com/-/media/HS/T-290612-6.pdf>. Accessed on 22 January 2014.

363 *ibid.*

364 Hatch, *Legacy Project: LNG Train-4 Expansion Project*. Available at: http://www.hatch.ca/oil_gas/projects/lng_train4.htm. Accessed on 14 January 2014.

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project. Ultimately, though, an EPCM contract for train 5 was awarded to UK-based global conglomerate Foster Wheeler.³⁶⁵

4.24 Clearly, Western Australia had the capacity and capability to successfully undertake the design engineering of a large and complex project.

4.25 A key point of distinction between trains 4 and 5 on the North West Shelf project was the method of fabrication and construction: train 4 was largely 'stick-built' on-site, whereas train 5 was the outcome of the world's first LNG plant modularisation project.³⁶⁶ In designing train 5, Foster Wheeler examined train 4 and divided its stick-built design into 75 pre-assemblies, surrounded by tie-in and separate in-situ works.³⁶⁷ The modularisation of train 5 allowed component manufacture to be outsourced to numerous low-cost fabrication centres with the aim of facilitating parallel work allocation to readily available labour and delivering schedule and cost savings.

4.26 While train 5 was completed ahead of schedule, the envisaged cost savings never eventuated. By its completion in 2008, the \$2.6 billion spent on train 5 had exceeded the original \$2 billion budget by 30 per cent, and was 62.5 per cent more than the \$1.6 billion that had been spent to design and build train 4.³⁶⁸

4.27 The significance of having successfully designed train 4 of the North West Shelf in Perth, only to lose the follow-up opportunity on train 5, was articulated by a Perth-based engineer who had experience on both projects:

*I was on train 4 and believe me... that was a good project that we did a good job on. It was almost on budget and it was almost on schedule. When... LNG train 5 was awarded to London, it was a catastrophe for this city. We had a full team of engineers and support staff that could handle LNG work [but] they awarded it to London... the ball started rolling at the 2004 LNG train 5 and then Pluto and then all the other projects that followed, and that is why we have no work in town for oil and gas engineers; no high-end process work.*³⁶⁹

4.28 It is not possible to say whether train 5 would have been delivered on time and on budget if it had been designed and engineered in Perth. As the 2011 Economics and

365 Elston, Jodi, 'Fifth train enters home straight,' *The West Australian*, 28 August 2007, p 20.

366 Smith, Colin and Bowtell, Gary, *The First Modularisation of an LNG Plant: North West Shelf Venture Karratha Gas Plant Phase V Expansion Project*. Available at: http://www.ivt.ntnu.no/ept/fag/tep4215/innhold/LNG%20Conferences/2007/fscommand/PO_26_Smith_s.pdf. Accessed on 16 January 2014.

367 *ibid*.

368 Fitzgerald, Barry, 'North-West Shelf gas plant well over budget,' *The Age*, 12 June 2007. Available at: <http://www.theage.com.au/news/business/northwest-shelf-gas-plant-well-over-budget/2007/06/11/1181414214254.html>. Accessed on 14 January 2014.

369 Closed hearing, *Transcript of Evidence*, 15 November 2013, p 3.

Industry Standing Committee report shows, there was an approximately 120 per cent increase in upstream industry costs between 2005 and 2008, although at the time of that report these costs had recovered by about 20 per cent following the global financial crisis.³⁷⁰ Research has also found that megaprojects worldwide have ‘a 60 per cent failure rate in terms of cost or time overruns.’³⁷¹

4.29

It is possible, however, to say that taking the design of train 5 offshore effectively meant that the level of engineering skill and capacity declined as Australian engineers followed the work to places such as Reading and Houston.

The following excerpt from a 2008 article by the now Minister for Energy, Hon Dr Mike Nahan, MLA, concisely summarises the development of the fourth and fifth processing trains on the North West Shelf plant.

The State [of Western Australia] received a big leg-up in 2001 when Woodside awarded the design and oversight contract for the train 4 processing plant to the Kellogg Brown Root-Clough Consortium (KJV). Until this decision, all such work had been undertaken in either Yokohama, London or Houston.

The contract gave Perth the ability to develop as the fourth centre of excellence for LNG plant design. It was a huge opportunity.

While the design contract for train 4 was not large—about \$280 million—it led to the development of crucial skills locally; it located control of procurement of the rest of the \$2 billion project in WA and it drew in hundreds of allied service businesses and engineers to the State. [...]

In 2004-05 Woodside put out to tender a design and procurement contract for a new train. Given the success of, and skills developed, with train 4 and the fact the new gas train was to be an exact duplicate of the previous one, expectations were high that a local team would win the new contract.

However, Perth lost. The contract went to a consortium based in London. [...]

With train 5 went the foundations of the LNG engineering cluster. The engineers, companies and knowledge built up with train 4 left town, mainly for London.³⁷²

370 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, Parliament of Western Australia, 2011, p 29.

371 Business Council of Australia, *Securing investment in Australia’s future. Report of the project costs task force*, August 2013, p 7.

372 Nahan, Mike, ‘WA neds to back brains over brawn,’ *The West Australian*, 19 January 2008, pp 80–82.

The impact of the decline of engineering design in Western Australia

4.30 Evidence to the Inquiry demonstrated that the engagement of Australian engineers in the engineering and design phase of oil and gas projects effectively creates employment opportunities throughout the construction, production and export phases of the project. This generally is based on the argument that engineers design for businesses in their local supply chain, largely because they are aware of their capacity and capabilities.³⁷³

4.31 This was most succinctly explained by Mr Steve McCartney, WA State Secretary of the Australian Manufacturing Workers' Union (AMWU), as follows:

*The way this whole system works is the projects are run out of Houston; the design and engineering is run out of France, Reading in England or partly done in Singapore. They use their key supply chain people all the time and there is an A-list of suppliers who do not tender—they use them automatically—and there is a B-list of subcontractors who have to tender. It is a very hard list to get onto. It is absolutely impossible to get onto it if you do not get involved in the design and engineering... If we are not in the design and engineering phase, we do not end up in the supply chain.*³⁷⁴

4.32 This was further emphasised by a Perth-based engineer who had worked on the North West Shelf train 4 expansion project, and whose experience as a local engineer gave an insight into the way in which design work influences subsequent project stages:

*As an engineer... I know local companies in and around Australia. When these bid lists go out, I can make sure—not just me, but other engineers—that at least a local company is on there. If front-end engineering is awarded to London or Houston, they do not know anybody here in Australia. The poor fabricators here in Perth are not going to be within cooee of getting on a bid list. That is first base. When they are on bid lists, they can get serious and negotiate costs and things like that, but not to even get on first base is really poor. That is simply because everything is done abroad.*³⁷⁵

4.33 The popularity of the EPCM model in petroleum projects is a major challenge for Australian industry, particularly as all of the world's largest EPCM companies are headquartered outside Australia. In its submission to this Inquiry, Professionals

373 Submission No. 5 from Mr Chris Hicks and Mr Ken Owen, 28 August 2013, p 8.

374 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers Union, *Transcript of Evidence*, 1 November 2013, p 3.

375 Closed hearing, *Transcript of Evidence*, 15 November 2015, p 5.

Australia (formerly the Association of Professional Engineers, Scientists & Managers Australia—APESMA) argued that:

*the considerable size of many of these [EPCM] firms and their history working with oil and gas proponents around the world provides a competitive advantage over smaller firms based in Western Australia. None of these major firms have moved to develop a significant design office in Perth or have worked to create joint ventures with local partners to establish significant design offices in Perth. The lack of any significant design presence in Perth has made it difficult for local engineers to take advantage of the most lucrative opportunities provided by Western Australia's rich gas wealth.*³⁷⁶

4.34 This was echoed in the evidence of a Perth-based contract services manager who gave insight into the difficulties faced by Australian firms:

*I am medium-sized, top end, and I do very well. However, the likes of Shell will not entertain me for manpower, and mine is white collar. I am the engineers, subsea engineers, drilling engineers and mechanical engineers. They will not entertain me, because they have issued global contracts out of wherever—the UK or Haarlem. They say, 'No, you're not global.' I wonder why I need to be global. It is an Australian project... But these companies say, 'We've got global arrangements.' There is not one Australian company that has a global arrangement, because we are never invited to tender... There is only one company on that global provider outperforming us as a company. That is where it stands for me. It is my beef that they have these global contracts and we just do not get a look in as an Australian company, yet we have the capability.*³⁷⁷

4.35 As previously mentioned, many of the engineers who worked on the 2001 expansion to the North West Shelf project ended up leaving Perth to seek opportunities elsewhere.³⁷⁸

4.36 The lack of design-phase engineering opportunities for local engineers underscored the submission made by Professionals Australia, which expressed concern that proponents of LNG projects 'have not been providing fair opportunity to local engineering firms to bid for engineering works and have instead utilised international providers.'³⁷⁹ As a

376 Submission No. 26 from Professionals Australia, 16 June 2013, p 19.

377 Closed hearing, *Transcript of Evidence*, 15 November 2013, p 5.

378 Submission No. 5 from Mr Chris Hicks and Mr Ken Owen, 28 August 2013, p 5.

379 Submission No. 26 from Professionals Australia, 12 June 2013, pp 1–2.

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consequence, ‘the opportunity to maximise the benefit that Western Australia gains from its natural resources is already—and rapidly—slipping.’³⁸⁰

- 4.37 Professionals Australia argues that ‘the current resources boom [in Western Australia] should be leveraged to build an innovation sector in Western Australia which will deliver high-skill, high-wage jobs in perpetuity for the state.’³⁸¹ However, they assert that at present there is evidence of a trend that is completely at odds with such a goal:

*Figures released by the Department of Foreign Affairs and Trade show a near doubling in the importation of engineering services between 2009-2011 from \$1.2 to \$2.3 billion and a five year growth trend of 42.5%. At the same time, there has been a collapse of -23.9% in demand for engineers in Western Australia... We are now importing services at the expense of fostering local employment and industry opportunities.*³⁸²

- 4.38 This situation was described in a more positive light by the President of the WA Division of Engineers Australia, Mrs Helen Pederson:

*Australian engineers are very valued overseas. They are seen as hardworking, innovative and knowledgeable. We are trying to build a profession that can work globally and is well respected overseas. From a positive perspective, we hope that a lot of Australian engineers will be involved in these projects just by virtue of the fact that they are Australian engineers and they are well respected.*³⁸³

- 4.39 While the Committee appreciates the perspective offered by Engineers Australia, the evidence indicates that the flow-on benefits to the manufacturing and construction sectors of the Australian and Western Australian economies are linked with local engineering and design.

- 4.40 Furthermore, it is difficult to reconcile Engineers Australia’s position that Australian engineers are a valuable international commodity with the submission by Professionals Australia that more needs to be done to foster local engineering expertise. That Australian engineers are valued internationally suggests that there ought to be a greater focus upon retaining locally-developed engineering expertise.

- 4.41 This was further articulated by Mr Erik Locke of Professionals Australia, who explained that the association’s position is that:

380 *ibid.*

381 *ibid.*, p 1.

382 *ibid.*, p 2.

383 Mrs Helen Pederson, President, WA Division, Engineers Australia, *Transcript of Evidence*, 13 November 2013, p 8.

*it is best to keep your engineers here locally, to keep your skilled technical professional capacity here. Australia produces only about a third of its engineering requirements each year itself domestically; it imports two-thirds. We do not think that is sustainable or good or clever or a good way of running a country.*³⁸⁴

4.42

In July 2013 the Committee visited the newly-established North Australian Centre for Oil and Gas (NACOG) at Charles Darwin University (CDU) in Darwin. This facility was designed to be a one-stop shop for oil and gas expertise in the Northern Territory. A similar tour was made of the University of Western Australia's Oceans and Minerals and Energy Institutes in August 2013. These visits demonstrated that Australia has excellent facilities for developing local engineering expertise, and confirmed the evidence received by the Committee that engineering expertise is a large factor in determining the level of local content within major infrastructure projects.³⁸⁵

Finding 23

The use of global engineering, procurement and construction management (EPCM) contracting for LNG production projects has had a significant and deleterious effect upon the Australian and, in particular the Western Australian, engineering sector.

Finding 24

Establishing Perth as a global design centre potentially would have substantial benefits for multiple sectors of the economy.

Recommendation 14

The Western Australian Government work with the engineering representative organisations to develop strategies that will broaden, promote and retain the engineering skills base in Western Australia.

Importance of local design-phase engineering

4.43

Using local engineers who are more familiar with the capacity and ability of local companies can provide substantial benefits for project development. In gathering evidence for this Inquiry, the Committee toured the Australian Marine Complex (AMC) in Henderson. This included a tour of the Civmec fabrication facility located within the AMC. Mr Adam Portaro, the General Manager at Civmec, explained that much of the work undertaken within the facility arose out of past relationships between Civmec and various large construction firms. According to Mr Portaro, these relationships are increasingly important because, while price will always be an important factor in winning fabrication contracts, first-hand knowledge of a manufacturer's ability to

384 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 7.

385 These site visits are discussed further in Chapter 7 on opportunities arising from FLNG technology.

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produce high-quality work in accordance with specified time schedules is also a major factor.³⁸⁶

4.44 This importance is exemplified by the circumstances of the flare tower for Woodside's Pluto LNG plant. At a 2013 conference presentation, Woodside's Mr Gerard Ransom acknowledged that:

*it was identified during the project construction phase that the main Pluto LNG flare tower required replacement as it was not adequately designed for the high wind loading that occurs during cyclonic conditions at the Pluto LNG site.*³⁸⁷

4.45 The Pluto LNG plant was designed to have two flare stacks of varying height. In 2010 it was reported that neither of the flare stacks, which had been procured for the project from an international supplier, met Woodside's specifications for the Pluto plant.³⁸⁸ In fact, the Committee has heard evidence that the larger flare stack was so poorly manufactured that it 'swayed in the wind,' after having initially been installed.³⁸⁹ It was further reported that the decision to scrap both had 'resulted in a six-month delay in Pluto coming on-stream.'³⁹⁰ To rectify the problem, Woodside engineers engaged a local manufacturer to fabricate two new flare stacks. This work was able to be completed inside six months.³⁹¹

4.46 Mr Stephen Grocott of the Department of Commerce (DCom) gave further insight into the challenge faced by local manufacturing firms who are attempting to win work on projects being overseen by multinational proponents. According to Mr Grocott, 'something like 65 per cent of Australian companies failed to pre-qualify' to be able to even submit tenders for work on Chevron's Wheatstone project.³⁹² Describing this as a 'pretty damning statistic,' Mr Grocott explained that:

we are witnessing a widening cultural gap between the way the project proponents conduct their businesses and the way suppliers operate. We are seeing groups like Chevron and the iron ore companies place an increasing emphasis on issues like occupational

386 Mr Adam Portaro, General Manager, Civmec, 16 August 2013.

387 Ransom, Gerard, 'Pluto LNG Plant start-up,' Paper presented at the 17th International Conference & Exhibition on Liquefied Natural Gas, Houston, 17 April 2013.

388 Paton, James, 'Woodside partly dismantles flare towers at Pluto LNG to fix design flaw,' *Bloomberg News*, 22 October 2013. Available at: <http://www.bloomberg.com/news/2010-10-21/woodside-petroleum-reports-september-quarter-production-18-3-million-boe.html>. Accessed on 6 February 2014.

389 Closed hearing, *Transcript of Evidence*, 30 October 2013, p 13.

390 Stevens, Matthew, 'Flare stacks fail to stack up for Voelte,' *The Australian*, 1 December 2010, p 39.

391 Closed hearing, *Transcript of Evidence*, 15 November 2013, p 13.

392 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 3.

*health and safety, quality management and paperwork and reporting. For some of our companies that are used to doing things in a more straightforward manner, this is something that they find difficult to come to grips with.*³⁹³

4.47 Mr Grocott explained that DCom is:

*trying to address [the present situation] in a positive way through a program called the industry facilitation and support program where we provide funding support to suppliers to upgrade their capacity and capability to project proponents... So, [if] the project proponent says, "You need to upgrade your vehicles so you can get access on site" or "You need third party accreditation" or "Your occupational health and safety manual needs updating." We can help fund that.*³⁹⁴

4.48 Through this and other programs, Mr Grocott explained that the DCom had, over the past two years, 'assisted about 150 companies to initiate projects designed to enhance their attractiveness to resource projects.'³⁹⁵ The Committee regards this as a pleasing development. The Committee was also encouraged by the evidence of Woodside Executive Director, Mr Robert Cole, who stated that Woodside have 'been in Western Australia for a long time,' and that, as such, 'local content is a matter very close to [Woodside's] heart.'³⁹⁶ When questioned as to whether Woodside foresaw opportunities for Western Australian manufacturers on a possible Browse FLNG project—and the extent to which Woodside would seek to promote those opportunities—Woodside's Senior Vice-President, Mr Stephen Rogers, answered in the affirmative:

*Yes, we do see that opportunity existing and during the BOD [Basis of Design] stage of the work, we will address that and conduct our appropriate market research to establish exactly what prequalifications are necessary to get people on the bid list.*³⁹⁷

4.49 Despite this reassurance from Woodside, and as will be demonstrated in the following section, the design-phase engineering opportunities for locally based engineers will be very limited.

393 *ibid*, p 6.

394 *ibid*, p 6.

395 *ibid*, p 7.

396 Mr Robert Cole, Executive Director, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 7.

397 Mr Stephen Rogers, Senior Vice-President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 12.

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Finding 25

First-hand knowledge of suppliers' capacity and capability is an important aspect of design engineering.

Finding 26

Engagement of local manufacturing and fabrication businesses largely depends on local engineering in the design phase.

4.50 When pressed on the design-phase engineering for potential FLNG units for the Browse project, Woodside's Stephen Rogers acknowledged that by using Shell's proprietary FLNG technology, design-phase opportunities for WA engineers would be extremely limited. After stating that there would be opportunities for WA-based engineers to be engaged in 'the design of the main [FLNG] componentry,' on a possible Browse FLNG project, Mr Rogers conceded that it is 'most likely' that the vast proportion of the requisite engineering work would be done by Technip in Paris.³⁹⁸

4.51 The submission made by Engineers Australia acknowledged the difficulties faced by the Australian engineering sector in designing LNG plants, whether FLNG or onshore. According to Engineers Australia, there is 'little current design experience in Australia for such technology,' and, furthermore:

*the design of a vessel of the scale of an FLNG has never been undertaken in Australia and while the skills could be assembled for such an undertaking, they are already in place in other international design centres.*³⁹⁹

4.52 The comparative disadvantage faced by local engineering firms with respect to FLNG design was made clear by Mr Jean François Letellier, General Manager of GDF SUEZ Bonaparte. Mr Letellier confirmed that the proposed Bonaparte FLNG vessel would not be a derivative of Shell's technology and explained that GDF SUEZ Bonaparte had initiated an FLNG design competition between two consortia—both of which are based in Europe:

From the beginning, our strategy was to develop as the owner and to rely on the consortium of an engineering company who were world-class associated with a shipyard. Today there is a design competition ongoing between two consortia—namely, Technip [in France] associated with the DSME [Daewoo Shipbuilding & Marine Engineering] versus KBR [Kellogg, Brown and Root, in the United Kingdom] associated with HHI [Hyundai Heavy Industries]. There will

398 *ibid*, p 11.

399 Submission No. 28 from Engineers Australia, 14 October 2013, p 3.

*be a winner in this competition and this winner will be awarded the FEED and, subject to FID, the execution.*⁴⁰⁰

4.53 The rising popularity of EPCM contracting served to consolidate LNG engineering and design services in the global centres of London, Houston and Yokohama. The development of FLNG technology compounds the challenges WA faces in attracting design-phase engineering to Perth. It seems highly unlikely that any Australian engineering firm will be engaged in the process of designing an FLNG vessel.

Finding 27

Several factors conspire to exclude the Australian engineering sector from the FLNG design process. These include:

- the use of global engineering, procurement and construction management (EPCM) contracting and consequent tendering to overseas companies;
- the exodus of skilled engineers from Perth following the decision to design and engineer the North West Shelf train 5 overseas; and
- the design one, build many concept of FLNG project design and detail engineering being done totally overseas.

Subsea engineering and design opportunities

4.54 With the realisation of gas field development via FLNG, the decline in LNG design engineering opportunities for local engineers looks set to continue. The arrival of FLNG technology does, however, bring with it opportunities for subsea and explorations engineering—including opportunities that, in the case of otherwise stranded gas fields, may otherwise never have eventuated. In the case of the Browse project, regardless of how the Brecknock, Calliance and Torosa fields are developed, the drilling and subsea requirements will be vast. When that project ultimately proceeds, numerous engineering opportunities will be created as a result of these requirements. As such, the move by Woodside to progress the Browse project using FLNG technology provides an example of how FLNG technology might generate subsea engineering opportunities.

4.55 According to Woodside's Stephen Rogers, a potential Browse FLNG project would require significant undersea infrastructure componentry, including '57 subsea wells... over 190 kilometres of flowlines, 70 kilometres of umbilicals and 12 subsea manifolds.'⁴⁰¹ Mr Rogers gave context to these figures:

With 57 wells in the development, that is an enormous amount of drilling and completion work, and with drilling rigs that will provide

400 Mr Jean François Letellier, General Manager, GDF SUEZ Bonaparte, *Transcript of Evidence*, 21 October 2013, p 2

401 Mr Stephen Rogers, Senior Vice-President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, pp 6–7.

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*around 4 500 drill rig days to drill and complete the wells over the life of the field for this development. That creates enormous potential again in the drilling arena.*⁴⁰²

- 4.56 Such a significant drilling campaign will require substantial engineering support which, according to Woodside, will create ‘enormous opportunity here in Western Australia for local installation and fabrication contractors.’⁴⁰³ This echoes the information contained in Shell’s submission to the effect that the Prelude FLNG ‘will process gas that is fed to it from seven production wells,’ and, as a result:

*a significant amount of local expenditure will derive from the Prelude wells drilling campaign, commencing in 2013 with Broome as the key supply point.*⁴⁰⁴

- 4.57 Shell’s submission also states that ‘a number of contracts for subsea scope have been awarded to Australian firms.’⁴⁰⁵ According to information on the Project Connect database, contracts for subsea work have been won by the Perth offices of multinational companies JP Kenny, Fugro and Technip. Additionally, the contract to design and manufacture production hydraulic power units for the Prelude vessel was won by Western Australian hydraulics manufacturer Pressure Dynamics.⁴⁰⁶

Finding 28

FLNG technology potentially will generate opportunities for subsea engineering and design that would not have eventuated from otherwise stranded gas.

FLNG engineering

- 4.58 The realisation of commercially viable FLNG technology was the culmination of a vast research and development program undertaken by Shell. According to Mr Andrew Smith, Country Chair of Shell Australia:

Shell’s floating LNG is a mature design with more than 2 million man hours invested in research, detailed design development and integration of existing LNG technologies. Shell’s standardised floating LNG design focuses on safety, robustness and high availability to enable continuous stable LNG production. The design has gone

402 *ibid*, p 7.

403 Mr Stephen Rogers, Senior Vice-President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 7.

404 Submission No. 15 from Shell in Australia, 30 August 2013, p 8.

405 *ibid*.

406 Project Connect, *Current Projects Available for Shell Prelude FLNG Project*. Available at: http://www.projectconnect.com.au/Project_Details.asp?PID=367. Accessed on 16 January 2014.

*through extensive testing programs and simulations to ensure its safety throughout all weather conditions, including cyclones.*⁴⁰⁷

4.59 Much of the testing referred to by Mr Smith occurred at the Maritime Research Institute Netherlands (MARIN). With six testing basins constructed specifically for conducting scale model assessments of marine vessel performance under a range of realistic conditions, MARIN services have been used in the construction of almost 8,000 sea-going vessels.⁴⁰⁸ As such, MARIN is widely regarded as one of the world's foremost institutes for hydrodynamic research and maritime technology.

4.60 Even with the benefit of such sophisticated scale-model testing there is much to learn about FLNG technology once Prelude is deployed. As Professionals Australia submitted, 'No [LNG] plant is ever designed perfectly and there [is] a continuing demand for upgrades to improve efficiencies and rectification work as [a] plant enters its production lifespan.'⁴⁰⁹ By definition, this will necessarily be the case for floating LNG facilities. For example, optimising FLNG production and off take while relying upon human labour in actual weather conditions can only be undertaken once Prelude is operational. Therefore, as this knowledge will be generated locally, this task will likely benefit the WA engineering sector.

4.61 This point was emphasised by Woodside in relation to the proposed Browse FLNG development as follows:

*On the engineering side we are looking at hundreds of engineers necessary for both the subsea development and the FLNG side of things... so we see a significant amount of engineering for combined development being conducted here in WA... by doing that engineering here in Western Australia, it means that we have an experienced workforce ready to service the technical and maintenance aspects of this program as we go forward, bearing in mind that there is a 40-year operational life associated with Browse. It is important for us to establish that technical infrastructure early on in the piece to be able to support the facilities.*⁴¹⁰

407 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, pp 2–3.

408 Marine Research Institute Netherlands, *History*. Available at: <http://www.marin.nl/web/Organisation/History.htm>. Accessed on 16 January 2014.

409 Submission No. 26 from Professionals Australia, 12 June 2013, p 21.

410 Mr Stephen Rogers, Senior Vice-President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 7.

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4.62 Mr Rogers also indicated that Woodside's preference is to engage Western Australia's engineering sector to meet these engineering requirements, stating that:

*a substantial amount of the engineering for the FLNG unit, as well as the subsea system, will be carried out here in WA... [and] a significant amount of the project management will be carried out here in WA. Woodside as operator is in a position to insist on that.*⁴¹¹

4.63 According to Woodside, this preference for Western Australian workers makes good business sense, because being able to rely upon local expertise generates 'a long term benefit' for the company.⁴¹² Retaining 'the knowledge and the experience here in WA,' enables Woodside to 'provide technical services effectively and efficiently through the life of the field.'⁴¹³ As a consequence, if Browse gas is eventually developed as an FLNG project, Woodside would 'definitely [be] looking to have significant elements of the engineering carried out here in Perth.'⁴¹⁴

4.64 With regard to the operational requirements of FLNG technology, Engineers Australia was equally positive. According to its submission, FLNG facilities:

*will be in situ for 15 to 20 years in each field and during that time will require operational personnel from many professions, including operators, engineers from many different disciplines, technicians and support personnel, virtually all of whom can be sourced from the existing skill pool in Western Australia. The facilities will require ongoing maintenance... [and] much of this work would logically be undertaken by Australian based engineers and technicians.*⁴¹⁵

4.65 It therefore seems reasonable to suggest that maintaining production efficiency on FLNG projects will generate opportunities for engineers in WA. As Mr Luke Musgrave, Vice-President, LNG, of ExxonMobil (Australia), explained, there is:

a whole plethora of technologies that are required to maintain and operate and inspect and all the billions of dollars of facilities that are being installed under the water and up in these remote locations. To be able to source those resources from Australia—from places like Perth that are very well-positioned to supply all of the needs and

411 *ibid*, p 8.

412 *ibid*, p 11.

413 Mr Stephen Rogers, Senior Vice-President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 11.

414 *ibid*. Woodside is not yet certain that FLNG technology will be used to develop the Browse fields, and the FID for Browse has not yet been taken.

415 Submission No. 28 from Engineers Australia, 14 October 2013, p 5.

*technologies that north west Australia will need in the future—is a very powerful thing.*⁴¹⁶

Finding 29

The operations phase of FLNG projects has the potential to generate engineering opportunities in Western Australia, in particular subsea engineering.

An engineering centre of excellence?

4.66 As will be shown in Chapter 7, many submissions suggested that Western Australia could become an FLNG centre of excellence. As some of this evidence relates to the possibility of an engineering centre of excellence it is useful to briefly consider the possibility for Perth to become an engineering centre of excellence and the possible benefits that might flow from such a centre.

4.67 Professionals Australia strongly argues that establishing Perth as ‘an innovation hub for LNG engineering and design,’ would bring great benefit to WA.⁴¹⁷ In particular, it would enhance local skills in the production and export of natural gas, alleviating the need to import these skills in the future. An important facet of any such goal would be the role played by the tertiary sector. ‘Universities,’ Professionals Australia submitted, ‘should have greater involvement with LNG gas developers and should tie their research and training to specific industry demands.’⁴¹⁸ According to Professionals Australia:

*ongoing dialogue between Universities and industry needs to improve and be better coordinated. This will allow industry to help develop curriculums to meet changing needs in the gas market and ensure a seamless supply of highly trained recruits that will help to go about addressing skills shortages. Having a formal dialogue and a simple streamlined process for graduates to move from university into their professional life will help to maximise the number of graduates—particularly international students who often face difficulty finding sufficient work to remain in Australia—stay within the local engineering profession and develop lifelong careers.*⁴¹⁹

416 Mr Luke Musgrave, Vice-President, LNG, ExxonMobil (Australia), *Transcript of Evidence*, 21 October 2013, p 9.

417 Submission No. 26 from Professionals Australia, 12 June 2013, p 39.

418 *ibid*, p 40.

419 Submission No. 26 from Professionals Australia, 12 June 2013, p 40.

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4.68 The potential benefits that may flow from FLNG technology expertise was also emphasised in the submission made by the Western Australian Energy Research Alliance (WA:ERA), which stated that:

*the increasing scale of the petroleum industry in Western Australia and the presence of a growing number of international operators provides an opportunity to further build Perth as a centre for innovative science and engineering learning from other global centres such as Aberdeen and Stavanger.*⁴²⁰

4.69 The importance and possible flow-on benefits associated with the generation of first-hand FLNG expertise in Western Australia was confirmed by Ms Leanne Hardwicke of Engineers Australia, who said that ‘practical experience is critical in determining an engineer’s capacity to make independent engineering design decisions and in meeting the requirements of many projects and positions.’⁴²¹ Ms Hardwicke explained that Australia:

*is a recognised world leader in the complex and technically challenging field of remote operations. This, coupled with the potential number of FLNG facilities in Western Australia, makes us well placed to potentially become a world leader in the knowledge base of operational support of FLNG facilities as they evolve and become more commonplace.*⁴²²

4.70 This was reiterated during a closed hearing by a senior executive of one of the world’s largest engineering and design firms, who explained that the firm’s Australian office was already benefiting from its proximity and exposure to the development of Shell’s Prelude project:

*if I look at the number of inquiries that reach our desk of FLNG, Australia is a big portion of that. There are now other areas of the world looking at FLNG. Australia is really the largest. If... an Australian company [is] investing overseas in FLNG, it is highly likely that they would make use of services out of our local office. That is how we see that [centre of excellence] potentially becoming a reality.*⁴²³

420 Submission No. 4 from the Western Australian Energy Research Alliance, 26 August 2013, p 2.

421 Ms Leanne Hardwicke, General Manager, WA Division, Engineers Australia, *Transcript of Evidence*, 13 November 2013, p 3.

422 *ibid.*

423 Closed hearing, *Transcript of Evidence*, 26 February 2014, p 2.

- 4.71 The manager of the company's local office also offered a forecast as to how the operational requirements of the Prelude FLNG project would benefit Western Australia:

*I think we are going to see a lot of support as the facility comes into Australia, so it gets towed in, and then with the offshore campaign, the logistics and the vessel support, and then the local procurement. Once the facility is commissioned, we then have an opportunity to bid and secure long-term post-production and post-start-up work in Australia. We are seeking to provide post-start-up engineering services. Then there will be inspection, repair and maintenance and potential modification work, which would largely be run out of Australia.*⁴²⁴

- 4.72 When asked to quantify the operational engineering requirements of Prelude which the company would hope to meet, the Committee was told that 'It would be an estimate, but it would be in the vicinity of 20 to 35 engineers, and that would be long term.'⁴²⁵

- 4.73 A similar sentiment was also expressed by the Director of GE Oil & Gas Australia, Mr David Leslie, who spoke at length about the operational opportunities generated by the LNG sector for engineers in Western Australia. Mr Leslie explained that GE's 'continued involvement in all the LNG projects,' had been 'the catalyst for GE's decision to establish dedicated service and maintenance facilities, as well as administration and skills development centres, at Jandakot here in Perth.'

*This commitment alone underpins an infrastructure investment of some \$120 million to support our operations. In terms of employment, GE Oil & Gas has increased almost sevenfold its in-country staffing in the region, from 64 staff in 2010 to 550 now. By year's end we anticipate a total oil and gas Australian–New Zealand region workforce of almost 600 staff, and have forecast that number to continue to grow to 1 000 employees as the projects move into operation and maintenance phase.*⁴²⁶

- 4.74 GE's experience in WA demonstrates the manner in which the LNG sector has underpinned strong growth in the state economy. While it should be noted that GE's commitment to Western Australia relates more to the growth in the LNG sector generally than it does to FLNG specifically, this commitment—and the employment opportunities that it has already and will continue to generate—support the argument

424 *ibid*, p 7.

425 *ibid*.

426 Mr David Leslie, Director, GE Oil & Gas Australia, *Transcript of Evidence*, 15 November 2013, p 2.

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that there are some opportunities to be found in FLNG technology. Certainly GE's expanding operations have made a strong contribution to the state's economy, with Mr Leslie informing the Committee that:

*GE Oil & Gas has continued to increase the local expenditure from its Jandakot operations. In 2013 through to the end of October, we had purchased around \$34 million of equipment and service locally, which is more than double what we purchased in 2012, and that number continues to grow. We have also on-boarded more than 250 local Australian suppliers to our procurement systems to support the needs of the projects here. These investments in people, services and equipment are all direct benefits of GE's role to support our customers in the construction now and, later on, operation phase of LNG developments.*⁴²⁷

4.75 Furthermore, when questioned as to why GE decided to base its facility in WA—and not, for example, Singapore—Mr Leslie was clear:

*Yes, we could have chosen somewhere else. The fact of the matter is that we have a lot of customers in Perth who are very important to us.*⁴²⁸

4.76 In 2014 Perth is, as Mr Leslie pointed out, home to a lot of LNG industry activity. Indeed, Mr William Townsend of INPEX informed the Committee that, with more than 900 employees based here, the company 'now [has] more people working in Perth than anywhere else in the world.'⁴²⁹ The decision by GE to establish itself in Western Australia demonstrates the indirect economic benefit that is generated by this activity. In that it has the ability to open new options for field development, FLNG technology has the potential to further enhance this economic growth.

4.77 Another benefit associated with attracting a critical mass of engineering expertise to a single location was articulated by Professionals Australia, who submitted that one of the fundamental difficulties faced by local engineering firms relates to the cost of recruiting and training graduate engineers:

Often the difficulty with recruiting graduates lies in the costs associated with their development over their first few years in the profession before they are able to become independently productive to a company. The establishment of a centre of excellence in engineering with government targeted programs aimed at limiting the costs

427 *ibid.*

428 *ibid.*, p 4.

429 Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2.

*associated with taking on graduate engineers would lift the number of experienced engineers in Western Australia. This would limit skills shortages and make graduates both cheaper to develop and more conscious of industry needs.*⁴³⁰

4.78 It has been made clear during this Inquiry that engineering expertise is a highly transferrable skill. Ms Leanne Hardwick explained that ‘between 2001 and 2011, the average annual growth in demand for engineers for Western Australia alone was 8.6 per cent.’⁴³¹ However, this growth was far from steady: though 2010 saw a 45.5 per cent increase in demand, this was followed in 2011 by a 23.9 per cent decrease. Such fluctuating demand for engineering services only serves to undermine the international competitiveness of the Western Australian engineering sector. Engineering expertise provides a very solid foundation for strong performance by a number of industry sectors. It is therefore important to not only promote, but to retain, this talent in Western Australia, to the greatest extent possible.

4.79 Since 2000, petroleum companies have sanctioned the development of a total of eight LNG trains that have been or are being built in Western Australia. Despite successfully designing the first of these, engineers in Perth have not been involved in designing any of the subsequent seven. It seems unlikely that this trend in onshore LNG plant design will be arrested, owing to a range of factors, including a preference by petroleum companies to use EPCM contracting arrangements, and the fact that Perth is no longer able to draw upon sufficient LNG design expertise.

4.80 While FLNG technology represents a paradigm shift in the world of natural gas export, it remains untested. The claimed greater certainty in capital expenditure costs is used as the principal argument to use FLNG technology to produce LNG offshore. For engineers in WA, however, FLNG technology represents a continuation of the trend since 2000, as there will be no opportunities for Perth-based engineers to contribute to FLNG design engineering.

430 Submission No. 26 from Professionals Australia, 12 June 2013, p 33.

431 Ms Leanne Hardwicke, General Manager, WA Division, Engineers Australia, *Transcript of Evidence*, 13 November 2013, p 2.

Chapter 5

The impact of FLNG on Western Australia's fabrication and manufacturing sector

...the manufacturing sector overall continues to grow and adjust. Ultimately, what we need to see is the economy evolve—the sectors evolve from beyond traditional types of manufacturing operations to where the opportunities lie. The opportunities lie well beyond just feeding into the construction works of major projects.

Mr John Nicolaou, Chief Economist
Chamber of Commerce and Industry of Western Australia (Inc), 2013⁴³²

Introduction

- 5.1 Ever since Australia began exporting natural gas, producing this gas has generated work opportunities for Australian manufacturers and, in particular, for Australian metal fabricators. Even in more recent times, with most componentry for LNG projects being sourced internationally, metal fabricators in Western Australia (WA) have continued to make considerable and varied contributions to the procurement of natural gas production and liquefaction plants.
- 5.2 While local metal fabricators have faced a series of recent challenges—particularly as a result of a move towards modular fabrication—they have continued to make a strong contribution to WA's economy, at least in part through their contribution to the production of LNG. The use of floating liquefied natural gas (FLNG) technology as a method for developing Australian gas fields threatens to undermine this contribution.
- 5.3 FLNG technology, however, will also likely present opportunities to local manufacturers—albeit opportunities that will challenge the sector to embrace change. To properly appreciate the implications of FLNG technology for Australian manufacturers, and in particular Western Australian metal fabricators, it is useful to begin with an understanding of the important economic contribution made by Australia's manufacturing sector, and in particular the recent history of that contribution. To properly consider the broad contribution made by Australian manufacturers over the past ten years, the difficulty of competing in a global marketplace must also be contemplated.

432 Mr John Nicolaou, Chief Economist, Chamber of Commerce and Industry of Western Australia (Inc), *Transcript of Evidence*, 1 November 2013, p 3.

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- 5.4 With the contribution made—and challenges faced—by Australian manufacturers broadly outlined, the specific implications of FLNG technology can then be addressed. Evidence received in the course of this Inquiry suggests strongly that Australian metal fabricators will have no opportunity to contribute to the production of FLNG vessels, owing to a range of factors. This lack of opportunity means that FLNG technology will deny Australian manufacturers opportunities that would ordinarily arise during the fabrication and construction phase of onshore LNG plants—including the opportunity to fix substandard componentry procured from overseas, which is currently an important albeit unusual source of fabrication work.
- 5.5 Manufacturing is, of course, much more than metal fabrication. In particular the production of petrochemicals in Australia, which depends upon a steady supply of gas, needs to be considered in order to properly examine the implication of FLNG technology for Australian manufacturers.
- 5.6 Attention is paid to opportunities that may be generated for Australian manufacturers as a consequence of using FLNG technology to develop Australian gas fields. If Australian citizens are to derive maximum benefit from permitting the use of this technology as a method for developing their natural resources, it is important that Australia is properly equipped to take full advantage of these opportunities.

An important contribution

- 5.7 The September quarter edition of the Australian Bureau of Statistics publication *Australian national accounts: National income, expenditure and product* estimated that the Australian Gross Domestic Product (GDP) for 2012–2013 had been slightly above \$1,525 billion.⁴³³ This figure represented a 2.7 per cent increase on the previous year, and a 34.4 per cent increase in the ten years since 2002–2003.
- 5.8 The Australian economy is overwhelmingly driven by the services industry. More than half of the nation's GDP is attributable to the endeavours of that sector, and this has been the case for some time. After services, mining and construction were the next two most significant industries in 2012–2013, contributing 9.8 per cent and 7.6 per cent of GDP respectively.⁴³⁴
- 5.9 Manufacturing was the fourth largest industry in Australia in 2012–2013, with the contribution by Australia's manufacturers amounting to almost \$104 billion—a figure

433 The Australian Bureau of Statistics, *Australian national accounts: National income, expenditure and product*, 4 December 2013. Available at: [http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/376C9CE68BCBE792CA257C360012B7E3/\\$File/52060_sep%202013.pdf](http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/376C9CE68BCBE792CA257C360012B7E3/$File/52060_sep%202013.pdf). Accessed on 28 January 2014.

434 Australian Government Department of Industry, *Manufacturing Data Card*, December 2013. Available at: <http://www.innovation.gov.au/industry/manufacturing/Pages/ManufacturingDataCard.aspx>. Accessed on 28 January 2014.

that equated to 6.8 per cent of GDP.⁴³⁵ Though a considerable and important contribution, this figure represented a decline from 2002–2003, when the contribution was 9.2 per cent, and a significant decline from when the sector contributed about 25 per cent of Australia's GDP during the 1960s.⁴³⁶

5.10 Read in isolation, the ten-year statistics pertaining to Australian manufacturing seemingly indicate a sector in decline. While it is true that Australian manufacturers face a number of contemporary challenges, the fact that manufacturing now contributes a smaller percentage of GDP than was the case ten years ago must be considered relative to the fact that GDP has grown consistently through this period, owing largely to increased mining production. In fact, the value of total production by Australia's manufacturing industry increased 37 per cent from 1991–1992 to a peak of \$116 billion in 2007–2008.⁴³⁷ In the ten years since 2002–2003, Australian manufacturing production has been consistent at around \$110 billion annually.⁴³⁸

5.11 There has been a slip in more recent times: in 2012–2013 total manufacturing production amounted to just under \$104 billion, following on from \$105 billion in 2011–2012.⁴³⁹ Like all sectors of Australia's economy, manufacturing faces challenges in the face of globalisation. The economic contribution of our manufacturing sector, however, remains a fundamental element of our economic wellbeing. The vital role played by manufacturing in Western Australia's economy was articulated by Mr John Nicolaou, Chief Economist of the Chamber of Commerce and Industry of Western Australia (Inc) (CCIWA):

Western Australia's manufacturing sector remains robust and strong. Over the course of the last decade, manufacturing has grown and contributed around five per cent to the growth in the WA economy. It makes it the fourth highest, by industry sector, in terms of contribution to the WA economy. While there are challenges that occur as you get

435 Australian Government Department of Industry, *Manufacturing data card*, December 2013.

Available at:

<http://www.innovation.gov.au/industry/manufacturing/Pages/ManufacturingDataCard.aspx>.

Accessed on 28 January 2014. Manufacturing is the process of producing goods by using manual labour or by machinery. It is a single description for a diverse array of endeavours, and includes businesses involved in processing food to producing pharmaceutical products to smelting steel.

436 Productivity Commission, *Trends in Australian manufacturing*, 28 August 2003. Available at:

http://www.pc.gov.au/__data/assets/pdf_file/0005/8447/tiam.pdf. Accessed on 28 January 2014.

437 The Australian Bureau of Statistics, *Manufacturing industry: Economic contribution*, 24 May 2012.

Available at:

<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Manufacturing%20industry~147>. Accessed on 28 January 2014.

438 The Australian Bureau of Statistics, *Australian system of national accounts (Cat. No.5204.0)*.

Available at: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/5204.0>. Accessed on 29 January 2014.

439 *ibid*.

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*more specific in terms of industry sectors, the manufacturing sector overall continues to grow and adjust.*⁴⁴⁰

- 5.12 The importance of Australia's manufacturing sector is underlined by the fact that 934,100 persons—about 8.1 per cent of the Australian workforce—were employed within the sector over the three months to November 2013.⁴⁴¹ Beyond this, there are a number of reasons why a robust manufacturing sector is a fundamental component of any strong economy.
- 5.13 First and foremost, international trade is overwhelmingly in merchandise, rather than services. The World Trade Organization (WTO) recently calculated that merchandise exports (including non-manufactured mining and agricultural products) by WTO member nations totalled US\$17.3 trillion in 2012, against services exports of \$US4.25 trillion.⁴⁴² In total, US\$11.5 trillion worth of manufactured goods were exported in 2012.⁴⁴³
- 5.14 In addition, manufacturing drives technological innovation. Harvard Business School Professor Willy Shih has argued that 'advanced manufacturing provides an important institutional foundation for learning and developing process skills and capabilities that are increasingly intertwined with core R&D [research and development] in some of the industries most important to [any] country's economic future.'⁴⁴⁴ The experience in Australia supports this observation: in 2012–2013, the manufacturing sector, while accounting for 6.8 per cent of GDP, contributed 24.4 per cent of national expenditure on research and development.⁴⁴⁵ It is clear that the knowledge arising out of manufacturing expertise is an increasingly important global resource.

440 Mr John Nicolaou, Chief Economist, Chamber of Commerce and Industry of Western Australia (Inc), *Transcript of Evidence*, 1 November 2013, p 3.

441 Australian Government Department of Industry, *Manufacturing data card*, December 2013. Available at: <http://www.innovation.gov.au/industry/manufacturing/Pages/ManufacturingDataCard.aspx>. Accessed on 28 January 2014.

442 World Trade Organization, *Economies by size of trade in commercial services 2012*, Available at: http://www.wto.org/english/res_e/statis_e/its2013_e/its13_world_maps_serv_e.pdf. Accessed on 29 January 2014; and World Trade Organization, *Economies by size of merchandise trade 2012*, Available at: http://www.wto.org/english/res_e/statis_e/its2013_e/its13_world_maps_merchandise_e.pdf. Accessed on 29 January 2014.

443 World Trade Organization, *International trade statistics 2013*, Available at: http://www.wto.org/english/res_e/statis_e/its2013_e/its2013_e.pdf. Accessed on 29 January 2014.

444 Shih, Willy C., 'Just How Important is Manufacturing?', *Harvard Business Review*, 21 February 2012. Available at: <http://blogs.hbr.org/2012/02/just-how-important-is-manufact/>. Accessed on 28 January 2014.

445 Australian Government Department of Industry, *Manufacturing data card*, December 2013. Available at:

A difficult moment

- 5.15 Some Australian manufacturers currently face difficult circumstances competing on a global scale. This is evident within the fabricated metal products industry—a subset of the manufacturing sector that has found itself at the centre of the debate over the economic implications of floating liquefied natural gas (FLNG) technology. The respective May and December 2013 announcements by Ford and Holden, alongside the February 2014 announcement by Toyota, regarding the phased cessation of their operations in Australia brought into sharp focus the fact that it is difficult for the Australian fabricated metal products industry to compete in an increasingly global marketplace.⁴⁴⁶ The trend for this subset of Australia’s manufacturing industry has reflected this difficulty: while 90,000 persons were employed in the ‘fabricated metal product’ category in 2002–2003, this had declined to 65,800 persons by 2012–2013.⁴⁴⁷
- 5.16 There are a number of reasons for this, chief among which are the factors of fabricated metal production. The most significant cost component for metal fabricators is the cost of materials, which constitutes somewhere in the region of 50 per cent of the cost of a fabricated metal product produced by an Australian firm.⁴⁴⁸
- 5.17 In obtaining raw materials and capital componentry, Australian metal fabricators compete with international firms whose aggregate purchasing power (and material warehousing capacity) is vast. As a consequence, Australian metal fabricators often begin the process of production at a competitive disadvantage, as they are either unable to afford to tie up large swathes of capital in inventory, or else are simply unable to purchase materials in sufficient quantities so as to attract volume purchase discounts.⁴⁴⁹
- 5.18 To put this competitive disadvantage into context, it is useful to broadly compare the scale of WA’s main fabrication yard, which is the Australian Marine Complex (AMC) in Henderson, with that of an international competitor—for example, the Samsung Heavy Industries shipyard on Geoje Island in the Republic of Korea. The central element of the AMC is the Common User Facility (CUF), which is described as ‘a large, integrated

<http://www.innovation.gov.au/industry/manufacturing/Pages/ManufacturingDataCard.aspx>. Accessed on 28 January 2014.

446 ABC News, *Ford Australia to close Broadmeadows and Geelong plants, 1,200 jobs to go*, 23 May 2013. Available at: <http://www.abc.net.au/news/2013-05-23/ford-to-close-geelong-and-broadmeadows-plants/4707960>. Accessed on 30 January 2013. ABC News, *Holden to cease manufacturing operations in Australia in 2017*, 14 January 2014. Available at: <http://www.abc.net.au/news/2013-12-11/holden-to-cease-manufacturing-operations-in-australia-by-2017/5150034>. Accessed on 30 January 2014.

447 Australian Government Department of Industry, *Manufacturing data card*, December 2013. Available at: <http://www.innovation.gov.au/industry/manufacturing/Pages/ManufacturingDataCard.aspx>. Accessed on 28 January 2014.

448 Closed hearing, *Transcript of Evidence*, 30 October 2013, p 19.

449 Closed hearing, *Transcript of Evidence*, 30 October 2013, p 18.

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fabrication and assembly facility with extensive load-out wharves that is available to multiple, concurrent users.⁴⁵⁰ The CUF has extensive facilities, including:

*a dredged, deepwater harbour, a state of the art fabrication hall with 24 hour all-weather access, a ready to use on-site project office, workers amenities, warehouse and 40 hectares of laydown and construction land. It also has five wharves - a load out wharf and marine services wharf with notional capacities of 3,000 and 15,000 tonnes respectively and a newly developed marine maintenance wharf, floating dock, transfer system and distributed services to the laydown and construction areas. In addition there are established engineering and shipbuilding precincts nearby.*⁴⁵¹

5.19 Mr John O'Hare, General Manager, Marine and Defence, Oil and Gas at the AMC, explained that 'there is significant capability... in industry at the Australian Marine Complex.'⁴⁵² According to Mr O'Hare:

*the Western Australian government commissioned the creation and development of the Australian Marine Complex... to assist Western Australian and Australian companies to actively participate in major projects. That was the reason it was created. Its success has been, again, that primarily the private sector companies have invested in capability to undertake work in the marine, defence and extractive resource industries... it is there to assist Australian companies to participate in these projects by providing capability on a project cost basis, rather than themselves in terms of their capex. The common-use ethos of that was developed by the state—it was the first of its kind in the world.*⁴⁵³

5.20 In effect, the AMC was created by the Western Australian Government to address some of the competitive disadvantages faced by metal fabrication companies in Western Australia. These companies, whose individual operations would not be sufficient to sustain a facility like the AMC, are nonetheless able to benefit from having access to a dedicated, shore-based facility that offers significant economies of operational scale.

450 Australian Marine Complex, *About the AMC*. Available at:

<http://www.australianmarinecomplex.com.au/About-the-AMC/>. Accessed on 28 January 2014.

451 Australian Marine Complex, *Common User Facility*. Available at:

<http://www.australianmarinecomplex.com.au/Facilities-%26-Precincts/Common-User-Facility/>. Accessed on 28 January 2014.

452 Mr John O'Hare, General Manager, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 8.

453 *ibid*.

5.21 In August 2013 the Committee undertook a site tour of the AMC, visiting both the CUF and a fabrication workshop within the AMC run by private construction and engineering company Civmec. Within the CUF, the floating dry dock was identified as the single most important component. The floating dry dock, which is more than 100 metres long and 40 metres wide, is in relative terms quite large, and is fundamental to the successful operation of the CUF.⁴⁵⁴ The Committee was informed that the original CUF plans envisaged a floating dock that was about half the size of the one that was ultimately procured, mainly because floating dry docks become exponentially more expensive as they increase in size. It was suggested to the Committee a smaller floating dock would have been an expensive error. In particular, the 40 metre width of the existing floating dry dock allows maintenance work to be carried out on a much broader array of vessels than would have been the case with a narrower floating dry dock.⁴⁵⁵

5.22 DCom advised it would like to upgrade the capacity of the AMC with the addition of a second, identical floating dry dock. Mr O'Hare explained that:

*the majority of the work that is undertaken on dock 1 is commercial work, primarily supporting the oil and gas industry... [but] we had an agreement that the dock has to be ready for an emergency docking of submarines. What that means is that we are a little limited because we cannot actually pull a propeller or work on a vessel in the dock because if we had cut the hull and pulled the propulsion system out and there was an emergency docking, it is not a good position to be in. The second dock would remove that, if you like, barrier and enable us to undertake further work on the dock itself.*⁴⁵⁶

5.23 The Committee was impressed with the management and function of the CUF: that there are now in excess of 150 private sector companies operating in and around the AMC is testament to its worth. The successful operation of the CUF also demonstrates the effective manner in which it is currently managed by AMC Management, a private company, and administered by the Department of Commerce (DCom).

454 Australian Marine Complex, *Common user facility—Floating dock*. Available at: http://www.australianmarinecomplex.com.au/_document/pdfs/common-user-facilities-policies/1.3-AMCCUF-Floating-Dock-eBrochure.pdf. Accessed on 28 January 2014.

455 The Committee was hosted at the Australian Marine Complex by Mr John O'Hare, General Manager, Marine & Defence, Oil & Gas, Australian Marine Complex, Department of Commerce. During the Committee's visit, Mr O'Hare and Ms Pru Ayling of the Department of Commerce, gave a comprehensive overview of the AMC's facilities.

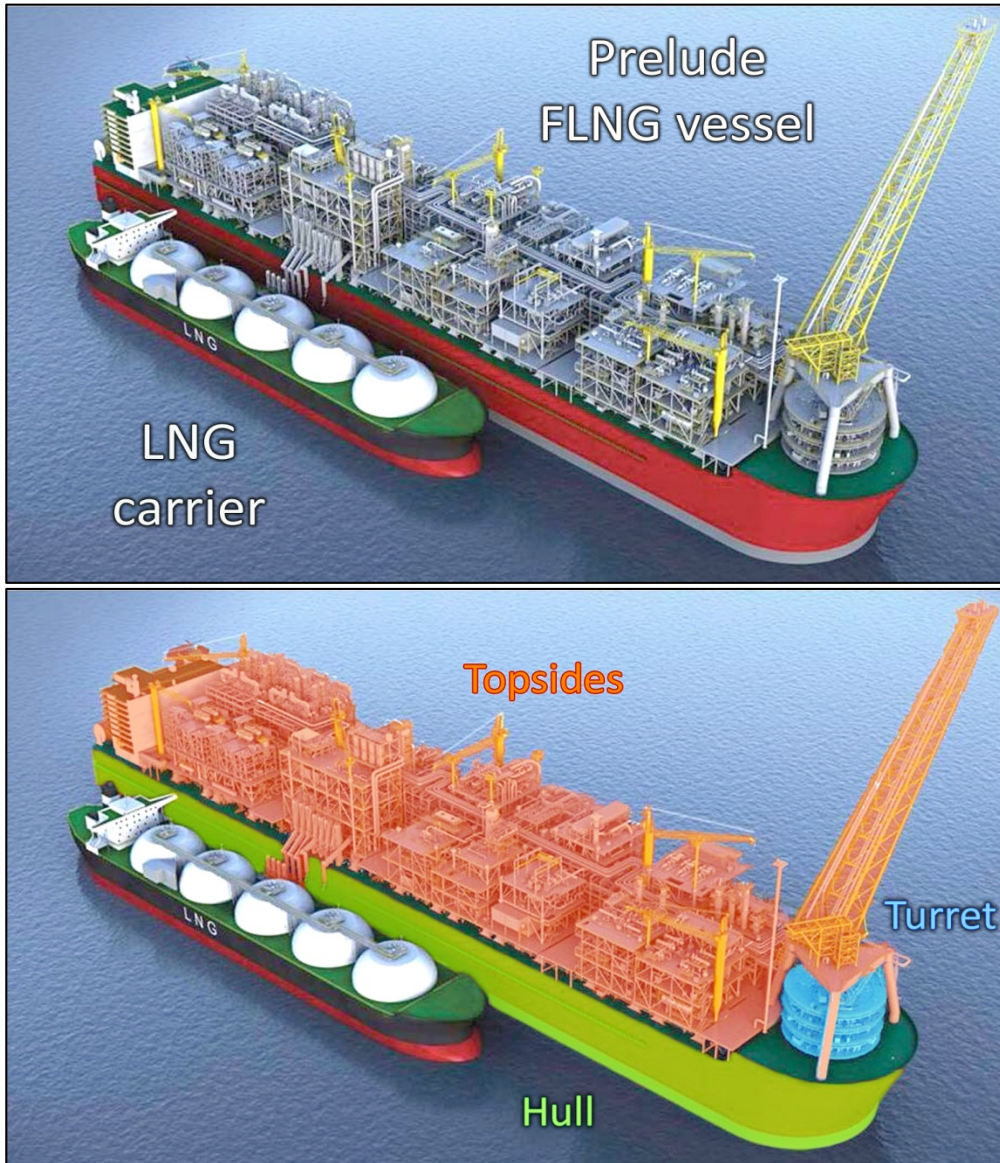
456 Mr John O'Hare, General Manager, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 9.

Prelude

- 5.24 In May 2011 a consortium comprised of French engineering, procurement and construction management firm Technip, in partnership with Samsung Heavy Industries, was contracted by Royal Dutch Shell to construct the Prelude FLNG vessel. Construction began in the Samsung Heavy Industries shipyard in Geoje shortly thereafter. The scale of the Prelude vessel is unprecedented: the vessel will be 488 metres long and 74 metres wide, and when fully ballasted it will weigh in the order of 600,000 tonnes.⁴⁵⁷
- 5.25 For the sake of simplicity, an FLNG vessel can be conceptually broken down into three separate elements. In addition to the hull, there is infrastructure required for gas processing and liquefaction as well as vessel operation (collectively referred to as the ‘topsides’), and the interior ‘turret.’ A massive cylindrical structure, the turret for Prelude will sit within one end of the vessel, with all gas flowlines and mooring chains attached to the turret from below. Prelude has been designed so that the turret will remain in place while the hull is able to rotate, or ‘weathervane’ around it, with this motion determined by prevailing wind and ocean conditions.⁴⁵⁸
- 5.26 None of the three elements of the Prelude vessel are being manufactured in Australia. As such, the most apparent impact of FLNG technology on Australia’s manufacturing industry—and in particular, Western Australia’s metal fabrication sector—is the potential loss of work opportunities associated with fabricating components required in the construction of onshore gas processing and liquefaction plants. To appreciate this lack of opportunity, it is useful to consider each of the three FLNG vessel elements in turn.

457 Shell Australia, *Prelude FLNG*. Available at: <http://www.shell.com.au/aboutshell/who-we-are/shell-au/operations/upstream/prelude.html>. Accessed on 28 January 2014.

458 Mr Steven Kauffman, Engineering Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 6.

Figure 5.1: Schematic of Shell Prelude FLNG elements⁴⁵⁹

FLNG hulls

5.27

A hull of the magnitude and capacity of Prelude could only be fabricated in a facility like Samsung's Geoje shipyard. There is no facility in Australia capable of fabricating a hull of such vast size.⁴⁶⁰ Furthermore, Shell claims that the sheer size of the Prelude vessel is an important component of its functionality, in that its size and weight enable the

⁴⁵⁹ Source image obtained from Submission No. 15 from Shell in Australia, 30 August 2013, p 7.

⁴⁶⁰ During a closed hearing attended by persons with intimate knowledge of Australia's metal fabrication industry, it was suggested to the Committee that while there is sufficient expertise and ability in Western Australia to enable the fabrication of a Prelude-sized hull, geographic constraints and a lack of capital equipment would render such an undertaking impossible.

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vessel to remain 'on station and manned during a cyclone.'⁴⁶¹ The importance of scale in FLNG design is confirmed by a brief consideration of the Petronas PFLNG1 vessel: despite being designed with just one-third of the output capacity of Prelude, PFLNG1 will be almost three-quarters of Prelude's size.⁴⁶² FLNG vessels, whatever their output capacity, will be massive marine structures.

FLNG topsides

5.28 Despite the fact that they are designed specifically for a constrained marine environment, it has been suggested that FLNG topsides are broadly similar to the gas processing and liquefaction infrastructure of onshore LNG plants. This was most succinctly explained by Mr Bill Townsend, General Manager of External Affairs and JV at INPEX, who said that:

*floating LNG and LNG are really the same. It just happens to be that floating LNG is an LNG project that is being developed on a ship, whereas LNG projects traditionally have been developed on land, but we do not entirely really make a distinction between them.*⁴⁶³

5.29 This was also the position advanced by Mr Shaun Gregory, Senior Vice President of Health, Safety, Environment and Technology at Woodside Petroleum, who informed the Committee that 'the existing LNG technology and the floating technology are established... [with FLNG] we are just merging them together.'⁴⁶⁴

5.30 This evidence suggests that Western Australian metal fabricators might have an opportunity to produce topside modules for FLNG vessels. Western Australian metal fabricators can point to their demonstrated expertise in manufacturing LNG plant infrastructure: trains 1–4 of the North West Shelf LNG plant were all 'stick built' in Western Australia, and approximately 5,000 tonnes of structural steel for the ConocoPhillips Darwin LNG plant was also fabricated in Western Australia.⁴⁶⁵

461 Mr Steven Kauffman, Engineering Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 6.

462 DNVGL.com, *DNV to class PETRONAS FLNG unit, expected to be the world's first in operation*, 2 May 2013. Available at: http://www.dnv.com/industry/oil_gas/publications/updates/oil_and_gas_update/2013/01_2013/dnv_to_class_petronas_flg_unit_expected_to_be_the_worlds_first_in_operation.asp. Accessed on 5 February 2014.

463 Mr Bill Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 3.

464 Mr Shaun Gregory, Senior Vice President, Health, Safety, Environment and Technology, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 4.

465 Ms Kayleen Ewin, Vice President of Sustainable Development, Communication and External Relations, ConocoPhillips Australia West, Electronic mail, 20 February 2014.

5.31 The capacity for modules to be fabricated in WA was also commented upon during a closed hearing, with a witness familiar with the capacity and capabilities of the AMC telling the Committee that:

*if we are talking about building the actual ship, with that capability and that sized module, it is reasonable to say Western Australia does not have it. But Western Australia has the capability, capacity and experience to build FLNG modules, because it has done it.*⁴⁶⁶

5.32 Indeed, WA's metal fabrication industry has experience in manufacturing topside componentry for offshore vessels, having manufactured four topside processing modules for Woodside Petroleum's Northern Endeavour floating production storage and offloading (FPSO) vessel in 1999.⁴⁶⁷ Manufactured to sit atop a 273 metre long, 50 metre wide steel hull which was built by Samsung Heavy Industries, these modules were fabricated in Fremantle before being transported by barge to the Sambawang shipyard in Singapore, where they were installed into the vessel.⁴⁶⁸ The FPSO was then commissioned to produce oil from the Laminaria and Corallina fields in the Timor Sea. This production has been ongoing since November 1999.⁴⁶⁹

5.33 Notwithstanding this expertise, no Australian metal fabricators are currently involved in manufacturing topside modules for Prelude. Furthermore, none of the planned Australian FLNG projects will involve Australian topside module fabrication. Proponents argue that while the LNG production process is broadly similar for onshore and FLNG gas processing, because the FLNG vessels themselves are extremely complex and integrated units they will not be fabricated in Australia. Furthermore, it is suggested that with the technology still in its infancy, building an FLNG vessel requires fabricating the hull and topsides simultaneously, and in the same fabrication facility. In the case of Prelude, for example, topside fabrication is being undertaken by Samsung Heavy Industries in the Geogje Island facility, alongside the hull.

5.34 The advantage of an integrated approach was given context by the General Manager of GDF SUEZ Bonaparte, Mr Jean-François Letellier, who explained that the topsides and

466 Closed hearing, *Transcript of Evidence*, 30 October 2013, p 17.

467 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Briefing*, 28 June 2013, p 4.

468 Sembawang Shipyard, *Northern Endeavour: Successful conversion of FPSO Northern Endeavour for Woodside Petroleum*. Available at: http://www.sembship.com/newsroom/images/review/Northern_Endeavour.pdf. Accessed on 3 February 2014.

469 Woodside Petroleum, *Northern Endeavour Floating Production Storage and Offloading (FPSO) facility*, September 2013. Available at: [http://www.woodside.com.au/our-approach/consultation%20activities/northern%20endeavour%20floating%20production%20storage%20and%20offloading%20\(fps\)%20facility,%20laminaria-corallina%20fields,%20timor%20sea.pdf](http://www.woodside.com.au/our-approach/consultation%20activities/northern%20endeavour%20floating%20production%20storage%20and%20offloading%20(fps)%20facility,%20laminaria-corallina%20fields,%20timor%20sea.pdf). Accessed on 3 February 2014.

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hull of the proposed Bonaparte FLNG project would also be manufactured simultaneously, and by the same fabricator:

FLNG is not actually an LNG plant that you put on a barge, it is an integrated new object and you have to integrate it quickly. The choice and contracting strategy to minimise the risks of something not being done well, is to do it at the same place. This means that the hull and topsides must be done by the same main contractor, integrating everything.

[...]

*To be frank on the FLNG, today Australia does not have the capacity to build FLNG in an integrated way.*⁴⁷⁰

5.35 Notwithstanding Mr Letellier's comments about an integrated approach, the Committee notes that Shell, for example, have awarded Prelude FLNG topside packages to companies in Japan, USA, France, Italy, UK, Spain, South Korea, Germany and Norway, with an Australia company being contracted to supply topside pedestal cranes.⁴⁷¹

5.36 The Committee therefore questions why Australian suppliers are not able to play a more involved role, particularly when history has demonstrated Australia's capability and capacity to do so. One possible reason is the previously mentioned shift to the use of global engineering, procurement and construction management (EPCM) contracting.

5.37 In effect, there appears to be no opportunity for Western Australian manufacturers to undertake FLNG vessel fabrication work, such as the work that was done in Fremantle for the Northern Endeavour FPSO. Mr Steve McCartney, the State Secretary of the Western Australian branch of the Australian Manufacturing Workers' Union, worked on Northern Endeavour project during its execution in 1999. Mr McCartney gave some insight into how that fabrication project had benefited Western Australia. In giving evidence that the project had 'employed 1 000 workers and trained... about 120 apprentices,' Mr McCartney explained that:

we had four 1 300-tonne topside modules built at Fremantle. It was done on time and on budget and we did not have the rate of repairs that we deal with now with some of the work that comes in from offshore. But the important part of that was that it kept 1 000 people working for 18 months... The important factor about that was the amount of skills development on that particular project—the number

470 Mr Jean-François Letellier, General Manager, GDF SUEZ Bonaparte, *Transcript of Evidence*, 21 October 2013, p 4.

471 Submission No. 61, Closed Submission, 23 March 2014, p 4.

*of apprentices that got a real opportunity to learn their trade and build the skills that we are using now.*⁴⁷²

- 5.38 In addition to the two FLNG vessels currently under construction, several more are currently being considered as development options for various projects worldwide, including three Australian projects. According to the Engineering Manager of Shell Australia, Mr Steven Kauffman, in developing the technology for Prelude, Shell applied a standardisation design principle:

*The design objectives that Shell set at the outset of its development of floating LNG were to be safe, standardised—meaning design one, build many—robust, cost efficient and with a high availability to enable continuous and stable LNG supply.*⁴⁷³

- 5.39 Although the current strategy is to have the topsides for an FLNG project manufactured together with the hull, a proliferation of standardised FLNG technology may allow topside modules to be manufactured separately and subsequently installed into these hulls. Even if this does occur, however, it seems highly unlikely that Australian metal fabricators will ever produce FLNG topside modules as it is difficult to see the vast comparative disadvantages faced by Australian metal fabricators being overcome.

FLNG turrets

- 5.40 The Prelude turret, which is 30 metres in diameter and 150 metres tall, is the only main vessel component that is not being fabricated by Samsung Heavy Industries. The contract to manufacture the turret was won by Drydocks World, an international maritime service provider based in Dubai. To produce the turret, Drydocks World will fabricate five separate modules which, when assembled together, will weigh in the order of 10,500 tonnes.⁴⁷⁴

- 5.41 In floating oil and gas production facilities, turrets are fundamental components of what is referred to as ‘single buoy’ or ‘single point’ mooring systems (SBMs or SPMs respectively). Pioneered by Dutch-based company SBM Offshore some 30 years ago as an FPSO mooring solution, a turret mooring system consists of a turret column which is affixed to the vessel via a bearing arrangement. An SPM system permits the vessel to freely weathervane around the turret, which is itself connected via a number of anchor

472 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers’ Union, *Transcript of Briefing*, 28 June 2013, p 4.

473 Mr Steven Kauffman, Engineering Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 5.

474 Rigzone, *Drydocks World delivers Prelude FLNG*, 25 September 2013. Available at: http://www.rigzone.com/news/oil_gas/a/129227/Drydocks_World_Delivers_Prelude_FLNG_Turret_Module_to_Shell. Accessed on 5 February 2014.

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lines to the seabed.⁴⁷⁵ Resource fluid flowlines—oil in the case of FPSOs, or gas and condensate for FLNGs—also connect into the vessel via the turret.

- 5.42 Woodside's Senior Vice President, Mr Stephen Rogers, offered an explanation as to why an FLNG turret would be manufactured in a location separate to the hull and topsides. According to Mr Rogers:

*most of the turrets on floating production systems have been engineered in Monaco, and most of the build of those turrets has taken place with the various ship-related fabricators in Dubai. It is a very high-tech and fairly sensitive key piece of equipment for the integrity of any floating unit.*⁴⁷⁶

- 5.43 Noting that the fabrication of the Prelude turret is taking place in Dubai, the Committee asked representatives of Shell whether this fabrication work could have been undertaken in Australia. Shell's Commercial Manager of East Browse, Mr Ian Grose, expressed doubt:

*in that that turret is a very large structure of 30 metres in diameter and 150 metres in length, comprising six different modules. It was designed by SBM, a worldwide company, and they, as the subcontractor to Technip, looked to where they could fabricate it and had a shortlist of a number of shipyard-type sites because it is a significant fabrication. Dubai Drydocks World was the successful tenderer.*⁴⁷⁷

- 5.44 Questioned as to whether Shell could see benefit in assisting Australian metal fabricators to manufacture FLNG turrets, Mr Grose replied that 'it is not [Shell's] ambition to develop a turret fabrication facility in Australia; our ambition is to develop a floating LNG facility.'⁴⁷⁸ Mr Grose's doubt as to whether the Prelude turret could have been manufactured locally was affirmed during a closed hearing with representatives of metal fabrication companies, who informed the Committee that it might be unrealistic to suggest that a 10,500 tonne turret structure could be fabricated in Western Australia.⁴⁷⁹ As with the manufacture of FLNG topsides, whether or not there is the capacity to do so, it seems unlikely that WA companies will be given the opportunity by global EPCM companies to fabricate FLNG turrets.

475 SBM Offshore, *Turret Mooring Systems*. Available at: <http://www.sbmoffshore.com/what-we-do/our-products/turret-mooring-systems/>. Accessed on 5 February 2014.

476 Mr Stephen Rogers, Senior Vice President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 8.

477 Mr Ian Grose, Commercial Manager, East Browse, Shell Australia, *Transcript of Evidence*, 23 October 2013, pp 12-13.

478 Mr Ian Grose, Commercial Manager, East Browse, Shell Australia, *Transcript of Evidence*, 23 October 2013, p 13.

479 Closed evidence, *Transcript of Hearing*, 30 October 2013, pp 17-18.

Relative to onshore

- 5.45 It seems unlikely that Western Australian metal fabricators will be engaged in the process of manufacturing the componentry for FLNG vessels. As such, the use of FLNG technology would appear to be a significant blow to local manufacturers, and in particular metal fabricators, for whom the development of Australian gas fields has historically represented an important source of work.
- 5.46 The North West Shelf gas plant in Karratha consists of five LNG processing trains, two domestic gas trains, six condensate stabilisation units and three liquefied petroleum gas (LPG) fractionalisation units, as well as storage and loading facilities for LNG, LPG and condensate.⁴⁸⁰ It is supported by five offshore production facilities, being the North Rankin A, North Rankin B, Goodwyn A and Angel offshore platforms, and the Okha FPSO. The majority of this infrastructure—in particular, LNG trains 1-4 and both domestic gas trains, was fabricated in Western Australia.
- 5.47 The Committee recognises that the contribution by Australian metal fabricators to more recent LNG projects has not matched the level of involvement in the early phases of the North West Shelf project. Since 2005 a shift to modular construction has seen the majority of fabrication work for new LNG production projects, including expansions to the North West Shelf project, Woodside's Pluto plant and Chevron's Gorgon and Wheatstone plants, undertaken outside Australia, for various reasons.
- 5.48 The shift to modular construction reflects the cost and scheduling advantages that can be realised with this method: where building a major piece of infrastructure in situ must be undertaken in a linear fashion, modular construction allows multiple components to be manufactured concurrently. Furthermore, modular construction is effectively a necessity where environmental regulations restrict the area of land that is available for use.
- 5.49 Chevron's Gorgon project is based on Barrow Island, which is a designated class A nature reserve (Reserve No. 11648 under s 41 of the *Land Administration Act 1997* (WA)) to provide 'protection for marine flora and fauna and migratory birds.'⁴⁸¹ As a consequence, construction of the Gorgon plant has been subject to stringent environmental and quarantine requirements, and a strict limit on permitted land use

480 Woodside Petroleum, *North West Shelf Project*. Available at: <http://www.woodside.com.au/Our-Business/North-West-Shelf/Documents/NWSV%20Corporate%20Brochure.PDF>. Accessed on 5 February 2014.

481 Department of Environment and Conservation, *Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves (2007-2017 Management Plan No 55)*, report prepared by the Department of Environment and Conservation, p vi.

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on the island.⁴⁸² Less than two per cent of Barrow Island can be used for the purpose of gas processing, which has necessitated modular fabrication and construction techniques. Mr Colin Beckett, Chevron's General Manager of the Greater Gorgon Area, has described this technique as 'a just-in-time delivery system.'⁴⁸³ According to Mr Beckett, for the Gorgon project 'you really want to do things everywhere else and then only assemble it there.'⁴⁸⁴

5.50 The relatively small quantity of work awarded to Australian metal fabricators in support of recent LNG projects has been criticised by Australian industry representatives. In 2011, following the award of a \$50 million fabrication contract to Western Australian company AusGroup for the manufacture of about 7,500 tonnes of pipe spools for Chevron's Gorgon project, Mr McCartney of the AMWU noted that:

*while the AMWU welcomes all steel contracts and all steel jobs... [this contract] represents less than 3% of the total steel required for the Gorgon project alone... The contract is also a drop in the ocean, when you consider that our local fabrication industry has the capacity to manufacture more than 250,000 tonnes of steel per year.'*⁴⁸⁵

5.51 In 2012, when it was revealed that Japanese manufacturers JFE Steel Corporation and Marubeni-Itochu Steel would together supply 150,000 tonnes of line pipe for Chevron's Wheatstone project, the AMWU was similarly critical.⁴⁸⁶ According to the AMWU, while no tenders for fabricated steel had been awarded to Australian manufacturers, Daewoo Shipbuilding & Marine Engineering had won a contract to build a 57,000 tonne offshore platform, China's Bohia Oil Marine Engineering and Supply had been contracted to supply 42,000 tonnes of steelwork in the form of exterior componentry for the LNG processing modules, and Malaysia's Kencana had been engaged to fabricate the 60,000 tonne interior componentry of these modules. Mr McCartney described local engagement in the Wheatstone project as 'even poorer than [the]

482 The *Barrow Island Act 2003* (WA) initially limited the 'gas processing area' of Barrow Island to 300 of the Island's 20,200 hectares. On 18 December 2013 the *Barrow Island Amendment Bill 2013* (WA), which increased the 'gas processing area' to 332 hectares, was given Royal Assent.

483 Engineers Australia, *Local engineers crucial to delivering Gorgon*. Available at: <https://www.engineersaustralia.org.au/western-australia-division/local-engineers-crucial-delivering-gorgon>. Accessed on 5 February 2014.

484 *ibid.*

485 Canadoil Group, 'Chevron dishes Gorgon work, but union unhappy,' *Monthly News Update*, June 2011, p 66. Available at: http://www.canadoilgroup.com/download/DVD/E-NEWSLATTER/Canadoil%20Newsletter_Vol2.pdf. Accessed on 4 February 2014.

486 LNG Recruitment Group, *Union assault on Chevron, WA govt continues*, 20 April 2012. Available at: <http://www.lnggroup.com.au/industry-updates/219-union-assault-on-chevron-wa-govt-continues.html>. Accessed on 5 February 2014.

Gorgon project, which saw more than 90 per cent of the 300,000 tonnes of fabricated steel required for the project sourced offshore.⁴⁸⁷

- 5.52 The frustration expressed by the AMWU culminated in a protest march by about 4,000 people on 4 July 2012.⁴⁸⁸ This protest was later referred to by Mr McCartney:

*[T]he example that we would like to use would be the Gorgon project—395 000 tonnes of manufacturing. Until we had a rally out the front of Parliament House, the Australian Steel Institute, the local fabricators—I am talking about the level 2—tier fabricators, which employ more than 100 people—were saying to us that they did not get any of that work. They were desperate... Because of that rally we managed to claw back 23 000 tonnes of work out of the 395 000 tonnes. To give you some sort of indication of what that means, it means around about 18 months' to two years' work for 1 000 people and approximately 190 to 250 apprentices getting an opportunity off the back of that work.*⁴⁸⁹

- 5.53 Western Australian fabricators also privately expressed frustration to the Committee regarding the tendering process for LNG project work. The Committee has learned that bids submitted by Western Australian metal fabrication businesses for LNG project work—including work packages for the Prelude FLNG vessel—are often rejected without explanation or useful feedback. In evidence before the Committee, Shell's Country Chair, Mr Andrew Smith, explained that Shell has three main criteria for awarding work packages:

*When we look at contracting for things, the three main criteria are capability, cost and safety. They are the sort of three main criteria we will look at across all the areas. I think we need to focus on where we are going to be competitive. Like many companies, we have Australian participation plans, and the guiding principle there is about providing full, fair and reasonable access.*⁴⁹⁰

- 5.54 The Committee has trouble reconciling claims by oil and gas companies regarding an apparent desire to engage local manufacturers in their projects with the difficulties faced by local manufacturers in winning project work. The Committee believes that it would benefit all parties if LNG project proponents were to provide constructive

487 *ibid.*

488 Spooner, Rania, 'Workers rally for more locals on resource projects,' *WAtoday.com.au*, 4 July 2012. Available at: <http://www.watoday.com.au/wa-news/workers-rally-for-more-locals-on-resource-projects-20120704-21guo.html>. Accessed on 5 February 2014.

489 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Evidence*, 1 November 2013, p 3.

490 Mr Andrew Smith, Country Chair, Shell Australia, *Transcript of Evidence*, 23 October 2013, p 13.

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feedback to local manufacturers on failed bids, so that local manufacturers could better understand the specific criteria against which their bids are evaluated.

- 5.55 The move to modularised construction in LNG plant infrastructure has undoubtedly been to the detriment of Australian metal fabricators. Yet it is also the case that, whether through protest or geographic advantage, fabrication work can still be won by Australian manufacturers for onshore LNG plants. Furthermore, the AMC's Common User Facility was developed specifically to cater for modular construction in accordance with industry requirements. Despite this, these facilities have been largely ignored by industry. Furthermore, with FLNG technology, Australian manufacturers remain at a geographic disadvantage relative to the construction location and their disconnection from global supply chains.

Finding 30

While Australian manufacturers can still win fabrication work for onshore LNG plants, FLNG technology places them at a geographic disadvantage relative to the construction location and their disconnection from global supply chains.

Rework

- 5.56 Through the course of this Inquiry the Committee has become familiar with a prevalent feature of extractive resource industries, namely the need to employ Australian fabricators to work on componentry sourced from offshore low cost centres to make them fit for use before being installed. This is colloquially referred to as 'rework,' something that is not spoken about openly, but hides in plain sight all over the AMC. Indeed, during the Committee's site tour of the AMC, responses to questions by Committee members as to the function and status of numerous pieces of equipment being worked on in the AMC indicated that rework is a significant and important source of work for Western Australian metal fabricators.
- 5.57 The Committee experienced difficulty in gathering useful evidence pertaining to the prevalence of rework. The reluctance to speak about rework was put into context by Mr McCartney:

*When the repairs are done... there is a lot of pressure on those companies not to publicise those repairs... one particular company that I have knowledge of, it was made very clear to them that they were not to comment about the rework [but] the workers got hold of us. We did not know about, of course, their obligations to the client. We publicised it and that company does not exist anymore.*⁴⁹¹

491 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Briefing*, 28 June 2013, p 5.

5.58 In a closed hearing with a number of Australian metal fabricators, the Committee sought information on the proportion of internationally-sourced componentry, and was given further insight into why rework is rarely acknowledged:

It is very, very hard to measure, because a lot of the time it is kept secret. People do not want their dirty linen aired in public. There is no mechanism to examine this, and it is, unfortunately, a daily occurrence. It is one of those things where our businesses are constantly asked to quote on [initially procuring] this type of work and they are told they are too expensive. Then a few months later they are told, "Help! Help! We have bought this thing and it leaks"—or it is dangerous, it is wrong or they only made half of it and the rest of it is still sitting on a wharf [somewhere]. That is a daily occurrence for our members and it is incredibly frustrating.

*...It is a very common problem.*⁴⁹²

5.59 Rework causes budgetary problems for projects. It also represents a source of work for local metal fabricators, which is covered by non-disclosure obligations, and as such it is perhaps easy to understand the reluctance by local manufacturing firms to discuss this issue. For the AMWU, rework is a source of frustration, as was demonstrated by Mr McCartney's description of rework on Woodside's Pluto project:

*Part of the reason [the Pluto project] went billions of dollars over budget was because of the rework that had to be done to the flare tower and everything else that was done on the job. I am not complaining, because it gave our members more work to do, but they would really like to be involved in developing the high-end stuff in the first place.*⁴⁹³

5.60 When the issue of rework was put to Shell, Mr Smith indicated that while he did 'not recognise the experience [regarding rework] that other people may have shared with the Committee,' Shell was working hard to ensure that the Prelude FLNG vessel is manufactured to exacting standards:

Clearly, there are different places that people are having modular construction done. It is in our interests that there is a very high quality of work done in the modules yard. In the case of Prelude, that is in Korea. We are very comfortable with the quality of work being done on the modules involved in the Prelude project. I appreciate other projects in other industries may have other issues, but I do not recognise that in

492 Closed hearing, *Transcript of Evidence*, 30 October 2013, p 14.

493 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Briefing*, 28 June 2013, p 8.

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*our projects. Indeed, we have a great interest to make sure that it is done right the first time, as you would imagine.*⁴⁹⁴

- 5.61 As the Prelude vessel is yet to be commissioned and become operational, it is not clear what level of rework might be required. It is also not clear how Shell will approach the issue of rework if and when it is required.

Petrochemicals

- 5.62 The Committee did not receive a great deal of evidence on manufacturing derived as a secondary consequence of the production of Australian natural gas. It must be recognised, however, that manufacturing encompasses significantly more than metal fabrication, and many sectors of WA's manufacturing industry depend upon domestic gas supply. While the domestic gas implications of FLNG technology will be more fully considered in Chapter 8, WA's domestic gas supply does not and should never contemplate the receipt of nautical shipments of LNG. LNG is simply a method of transporting natural gas over large distances where pipeline transport is either impossible or economically infeasible. In Western Australia, the 1530 kilometre Dampier to Bunbury natural gas pipeline (DBP) means that there should be no reason to use LNG as a method of transporting natural gas from fields to Western Australian customers.⁴⁹⁵

Finding 31

Liquefied natural gas (LNG) is simply a method of transporting natural gas over long distances.

- 5.63 FLNG technology is only able to produce LNG. None of the gas from fields developed with FLNG technology will ever be supplied into the domestic market.
- 5.64 The manufacture of petrochemicals in particular depends wholly upon a steady supply of domestic gas. April 2006 saw the opening of a liquid ammonia plant on the Burrup Peninsula, virtually adjacent to the North West Shelf LNG plant. The plant, with an annual production capacity of 850,000 tonnes, is one of the largest ammonia plants in the world, and uses natural gas as a feedstock to produce ammonia via the Haber-Bosch process.⁴⁹⁶ According to ecologist Mr David Wolfe, fertilisers generated from

494 Mr Andrew Smith, Country Chair, Shell Australia, *Transcript of Evidence*, 23 October 2013, p 14.

495 The Committee acknowledges and appreciates that some natural gas users in Western Australia receive shipments of LNG that has been carried over land where pipeline infrastructure is unavailable.

496 Yara, *Production—Yara Pilbara, Australia*. Available at: http://www.yara.com/about/where_we_operate/australia_production_burup.aspx. Accessed on 5 February 2014.

ammonia, which makes atmospheric nitrogen nutritionally available, can be reasonably estimated as being responsible for sustaining one-third of the world's population.⁴⁹⁷

- 5.65 While there are alternatives to using natural gas as a source of energy, there is no viable alternative to using natural gas as a feedstock in the production of ammonia. In that gas fields developed with FLNG technology will not provide a domestic supply of natural gas, FLNG technology has negative implications for the domestic manufacture of this important chemical product.
- 5.66 The 2010 opening of Australia's first helium plant in Darwin also provides an interesting case study on the manufacturing benefits of processing natural gas onshore. The plant, which is operated by BOC Australia, was built next to the Darwin LNG plant and produces helium from the stream of natural gas that is piped in from the Bayu Undan gas field.
- 5.67 Helium has a multitude of uses: with a liquefaction temperature of -269 degrees Celsius, liquid helium is important in the operation of instruments with magnetic superconductors, such as magnetic resonance imaging scanners. Helium is also used to provide fast and controlled cooling in many industrial processes such as laser welding, leak detection and the production of semiconductors.⁴⁹⁸
- 5.68 Prior to the opening of the Darwin helium plant in 2010, helium that was in the Bayu Undan natural gas stream was simply vented into the atmosphere, notwithstanding its value.⁴⁹⁹
- 5.69 The BOC plant is the only helium plant in the southern hemisphere. Prior to its construction in 2010, Australia was totally reliant upon imported helium. With annual production of 150 million cubic feet, the Darwin helium plant means that Australia is now a net exporter of this important substance.⁵⁰⁰
- 5.70 While helium is an unusual component within a natural gas field, the production of helium in Darwin represents a manufacturing opportunity that arose as a consequence of processing natural gas onshore. That is, this opportunity would not have presented itself if FLNG technology were used.

497 Wolfe, David W., *Tales from the Underground: A Natural History of Subterranean Life*, Perseus, Cambridge, Massachusetts, 2001.

498 Manufacturer's Monthly, *BOC's Helium plant opened in Darwin*, 3 March 2010. Available at: <http://www.manmonthly.com.au/news/boc-s-helium-plant-opened-in-darwin>. Accessed on 5 February 2014.

499 Ferret, *BOC opens Australia's first Helium plant in Darwin*, 8 March 2010. Available at: <http://www.ferret.com.au/c/BOC-228458/BOC-opens-Australia-s-first-Helium-plant-in-Darwin-n884450>. Accessed on 7 February 2014.

500 *ibid.*

Opportunities

- 5.71 The Committee believes that there are probably no work opportunities for Australian manufacturers in the FLNG vessel fabrication process. Nevertheless, before an FLNG vessel can produce LNG, it must first be connected to a gas field, and fed by a steady flow of gas. As such, developing a gas field with FLNG technology requires numerous items of subsea infrastructure. There is no technical reason why these components could not be fabricated in Australia. As such, FLNG technology could present opportunities for local manufacturing work in this domain.
- 5.72 In the oil and gas industry the term *subsea* relates to the processes that occur, and the componentry that is installed, in underwater locations. If a discovered offshore gas field is to be developed, this process begins with the drilling of one or more wells. When the wells are ‘completed’ and are ready for production, they are fitted with a ‘wellhead’ and also generally a ‘Christmas tree,’ and then connected to a flowline through which the gas is fed—oftentimes via a production manifold—to the gas processing plant.
- 5.73 A wellhead is the surface termination point of a drilled well, which incorporates facilities for hanging the production tubing and installing the Christmas tree and surface flow-control facilities.⁵⁰¹ A Christmas tree—named because of its crude resemblance to a decorated tree—is an assembly of valves, spools, pressure gauges and chokes fitted to the wellhead used to control the flow of fluid—usually oil or gas, but also possibly water—out from (or even back into) a well.⁵⁰² A production manifold is a subsea structure designed to commingle and direct produced fluids from multiple wells into one or more flowlines.⁵⁰³ A flowline is a pipeline that connects the wellhead to a manifold or to processing facilities and carries hydrocarbons.⁵⁰⁴
- 5.74 Figure 5.2 provides an illustration of the subsea componentry of a Prelude-design FLNG development.

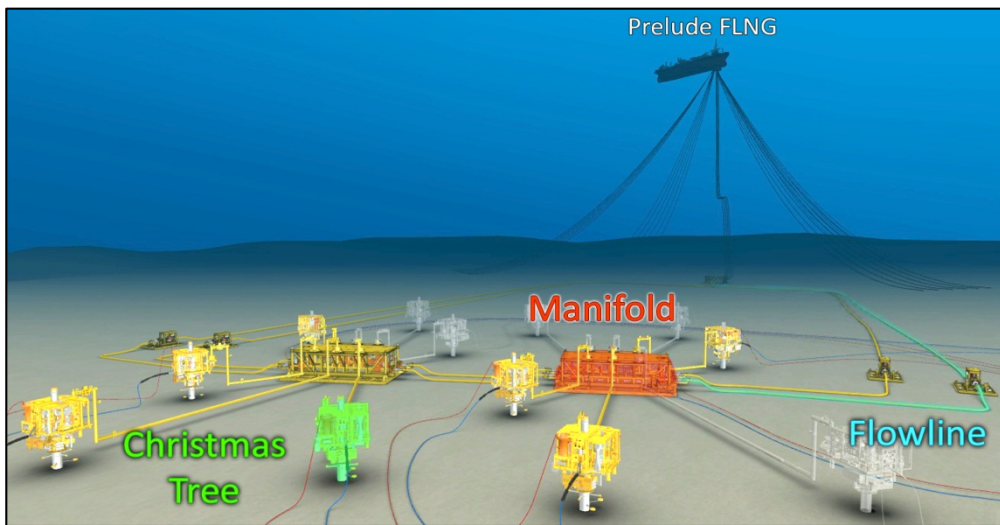
501 Schlumberger, *Oilfield glossary: wellhead*. Available at: <http://www.glossary.oilfield.slb.com/en/Terms/w/wellhead.aspx>. Accessed on 7 February 2014.

502 *ibid*.

503 OneSubsea, *Subsea production manifolds*. Available at: http://www.onesubsea.com/products_and_services/production_systems/subsea_manifolds/production_manifolds.aspx. Accessed on 7 February 2014.

504 Schlumberger, *Oilfield glossary: flowline*. Available at: <http://www.glossary.oilfield.slb.com/en/Terms/w/flowline.aspx>. Accessed on 7 February 2014.

Figure 5.2: Schematic of Prelude FLNG subsea infrastructure⁵⁰⁵



- 5.75 There are numerous other pieces of subsea equipment that may be installed, depending upon field characteristics.
- 5.76 Almost all of the gas fields off the coast of Western Australia are located in what is known as deepwater—offshore areas where water depths exceed approximately 200 metres, which is the approximate water depth at the edge of the continental shelf.⁵⁰⁶ Producing hydrocarbons from reservoirs located in deepwater is a considerable technological challenge, and requires sophisticated subsea production systems. Furthermore, the metocean conditions above these gas fields are also unique and challenging, owing to cyclonic activity and significant tidal movements.
- 5.77 Subsea production systems that are to be used in challenging deepwater environments must be manufactured to extremely high standards. These components will often be fabricated of exotic metals, such as stainless steel, with the fabrication process occurring in controlled environments using sophisticated techniques, such as energy beam welding.⁵⁰⁷ Quality of workmanship in this fabrication process is critical.
- 5.78 The Committee has heard evidence vouching for the quality of the work that is produced by Western Australian metal fabricators. According to Mr McCartney, ‘Australian industry standards—safety and industrial and building standards—are a lot

505 Source image supplied by Mr Mike Robinson, Manager – Sales & Marketing Australia and New Zealand, Subsea Systems, FMC Technologies.

506 Schlumberger, *Oilfield glossary: deepwater*. Available at: <http://www.glossary.oilfield.slb.com/en/Terms.aspx?LookIn=term%20name&filter=deep-water%20play>. Accessed on 7 February 2014.

507 The Committee was given an on-site briefing on controlled-environment energy beam welding of exotic metals by Mr Adam Portaro, General Manager, Cvmec during the Committee’s site tour of the AMC.

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higher than international standards.’⁵⁰⁸ In support of this claim, Mr McCartney observed that:

*Australian work is done to the letter of the contract and nothing less, and I do not think those standards are the same overseas or we would not be doing the rework we are doing now.*⁵⁰⁹

5.79 The Committee considers the fact that it is Australian metal fabricators who are engaged to bring poorly manufactured products that have been sourced internationally up to the requisite standard for use in Australia as evidence of the quality of workmanship produced by Australian metal fabricators. Furthermore, research being undertaken by tertiary institutions in Western Australia regarding the specific and unique challenges associated with the subsea environment around Australia’s continental shelf should generate unrivalled local knowledge and expertise regarding this environment. Therefore, and as the following demonstrates, the requirement for complex and sophisticated subsea componentry for FLNG projects—both in Australia and internationally—represents an opportunity for the Australian metal fabrication industry.

5.80 The possible opportunity for Western Australian fabricators to undertake subsea work associated with an FLNG project was also raised by Mr Rogers of Woodside Petroleum, who confirmed that the proposed Browse FLNG project would require significant subsea infrastructure. According to Mr Rogers, a Browse FLNG project would have:

*approximately... 57 subsea wells associated with [its] development, over 190 kilometres of flowlines, 70 kilometres of umbilicals and 12 subsea manifolds.*⁵¹⁰

5.81 As a consequence, Mr Rogers was confident that these subsea requirements would create:

enormous opportunity here in Western Australia for local installation and fabrication contractors. Manifolds are smaller units than large offshore platforms, so that puts them very much in the domain for local fabricators to be able to build them. With regard to the pipeline systems, we can use reel technology. Reel technology creates an opportunity for welding the pipelines together onshore here in

508 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers’ Union, *Transcript of Evidence*, 1 November 2013, p 8.

509 *ibid.*

510 Mr Stephen Rogers, Senior Vice President, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, pp 6-7.

*Western Australia before they are reeled onto the installation ships and taken offshore.*⁵¹¹

- 5.82 The Committee was encouraged by this evidence. Questioned as to whether this meant that ‘all’ of the requisite subsea equipment would be manufactured in Western Australia, Mr Rogers was less certain.

*No... the subsea Christmas trees [for example] are very specialist pieces of equipment. Today there are no specialist manufacturers in Australia to manufacture those.*⁵¹²

- 5.83 While it is true that no local manufacturers currently produce Christmas trees, there is no particular reason why they could not be fabricated in Western Australia. It must be acknowledged, however, that significant capital investment would be required in fabrication preparation. The need for this capital investment would represent a significant source of risk to local manufacturers who may be reluctant to invest on the strength of the potential for subsequent work.

- 5.84 This catch-22 situation was referred to by the WA State Manager of the Australian Steel Institute, Mr James England, in response to the suggestion that Western Australian metal fabricators lack the capacity to supply large-scale Western Australian projects. According to Mr England:

*we did not have the capacity... It comes up every second time we have this conversation. We did not have the capacity because we did not plan to have the capacity. We knew these projects were going to happen. We knew well in advance they were going to happen, but we did not plan to capture that work—all those tonnes of steel—therefore we did not have the capacity. We did not have the capacity to do Gorgon, but we knew it was coming for 20 years.*⁵¹³

- 5.85 In relation to whether Western Australian manufacturers could fabricate subsea production systems for FLNG projects, a witness who works in this industry advised that:

we have quoted on manifolds and skids. It is all possible. Depending on the size, then that takes a bit more complexity... The scope [is] there;

511 *ibid*, p 7.

512 *ibid*, p 7.

513 Mr James England, State Manager (WA), Australian Steel Institute, *Transcript of Briefing*, 28 June 2013, p 8.

*we just have to get the players. The only way we are going to do a bigger project is to collaborate [as an industry].*⁵¹⁴

- 5.86 The Ichthys LNG project, which will be operated by INPEX, is the most recent Australian LNG project to be approved for development. As such, the procurement of subsea production systems for that project gives some insight into how Australian manufacturers are currently positioned to win subsea fabrication work. When questioned as to where the Ichthys subsea production systems were being manufactured, Mr Townsend demonstrated that Australian manufacturers are not even in the picture. According to Mr Townsend:

*for the subsea production system, there is contract to GE Vetco out of Aberdeen. We also have a contract with McDermott, principally out of Indonesia. It is a US company, but Batam is building the riser support structure... The 42-inch-diameter pipeline is all produced. It is rolled both in Europe, in Germany by Europipe, and then in Japan. So that is the offshore components. In all of that there is no capacity in Australia to do any of that work... There is really only a handful of yards globally.*⁵¹⁵

Finding 32

The complex and sophisticated subsea componentry for Australian and international FLNG projects provides an opportunity for the Australian metal fabrication industry.

FLNG—a paradigm shift?

- 5.87 FLNG technology will be used for at least one Australian LNG project and possibly several others. By and large, this will have a negative impact on Western Australian manufacturers, who will most likely have no opportunity to win any work in the process of fabricating FLNG vessels.
- 5.88 While it has historically been the case that significant amounts of work on major Australian projects have been undertaken by Australian manufacturers, this has changed as various nations have become specialists in specific manufacturing endeavours. As a nation Australia is a strong advocate of global free trade, and the performance of the Australian economy in the contemporary era has demonstrated the merit of this position. As a result, for Australian manufacturers to win LNG project fabrication work they will need to be globally competitive.

514 Closed hearing, Transcript of Evidence, 30 October 2013, p 18.

515 Mr Bill Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 10.

- 5.89 The Committee is aware of two specific Western Australian manufacturers who compete globally on the strength of the quality of their products, namely Hofmann Engineering and Pressure Dynamics.
- 5.90 A specialist hydraulics manufacturer, Pressure Dynamics successfully tendered to supply three hydraulic power units for the Prelude Project.⁵¹⁶ This successful bid reflected the company's strong reputation as a single source solution for the design, manufacture and service of a range of hydraulic and automated control products. Known for its specialised approach and premium products, which are based upon significant investment in research and development, Pressure Dynamics has, according to Managing Director Joel Rawlings, 'had heavy involvement in nearly every major project in Western Australia's history over the last 35 years in one way, shape, or form.'⁵¹⁷
- 5.91 Based in WA, Hofmann Engineering is a global business with a total of 630 employees and annual revenue in excess of \$130 million.⁵¹⁸ Owing to their unique nature, the products fabricated by Hofmann Engineering are exported globally. Hofmann Engineering was the first in the world to develop forged (rather than cast) steel gears on a large diameter scale. Unlike cast steel gears, forged steel gears do not crack due to casting imperfections. This means that they offer vastly enhanced longevity of use and are thus preferred by mining companies.⁵¹⁹
- 5.92 Commenting on Hofmann Engineering, Mr McCartney remarked that:

*Hofmann has had a very good understanding of what it needs to diversify to stay in the industry. It is a small enough unit to diversify into parts for gearboxes and that sort of thing to get into the supply chain. It has been very successful with that. It is not very often you hear this from a union, I suppose, but you have to take your hat off to that company for the way it manages its company, its engineering and its workforce.*⁵²⁰

516 Shell Australia, *Prelude News*, May 2013, p 1. Available at: <http://s00.static-shell.com/content/dam/shell-new/local/country/aus/downloads/pdf/upstream/prelude-enews-may13.pdf>. Accessed on 10 February 2014.

517 Suttles, Claire, 'A new direction,' *Resource in Focus*, 20 December 2013. Available at: <http://www.resourceinfocus.com.au/index.php/2013/12/20/pressure-dynamics/>. Accessed on 10 February 2014.

518 Schratz, Allie, 'Hofmann Engineering,' *Business Review Australia*. Available at: <http://www.businessreviewaustralia.com/reports/Hofmann-Engineering>. Accessed on 10 February 2014.

519 *ibid*.

520 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Evidence*, 1 November 2013, p 6.

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- 5.93 Both Pressure Dynamics and Hofmann Engineering demonstrate that Australian manufacturers are able to fabricate products that can be exported globally. In both instances this can be attributed to an ability to manufacture unique, high-quality and technologically innovative products. Now more than ever manufacturing is a global industry, and Australian manufacturers cannot compete on price alone. Instead, the comparative advantage to be leveraged must be the ability to combine skilful manufacture with cutting-edge knowledge in fabricating componentry for which price is of secondary concern.
- 5.94 There is ample evidence to suggest that Western Australia's metal fabricators are able to produce high-quality work. FLNG technology will likely force these fabricators to focus their skills into specific, niche areas of manufacture. If this change is embraced, it is not unreasonable to suggest that the resulting output could be used not only in support of Australian projects, but indeed exported worldwide.
- 5.95 The Committee supports the view that as part of a Centre of Excellence, WA can be a successful fabricator of high quality, high value manufacturing for the oil and gas sector.
- 5.96 The Committee is undertaking further work on the opportunities arising from FLNG technology and will include fabrication and manufacturing opportunities in its later report.

Finding 33

As part of a Centre of Excellence, Western Australia can be a successful fabricator of high quality, high value manufacturing for the oil and gas sector.

Chapter 6

The impact of FLNG on Western Australia's construction and ancillary services sectors

... if you have a look at the future pipeline projects for Western Australia, and even if you look across the rest of the country, after the next three or four years, there is actually not much ... with Woodside and the Browse proponents making the decision to use FLNG technology up there—that was the next big project that we had in the pipeline—that has gone now and there is nothing to replace it.

Mr Stephen Price, Secretary, The Australian Workers' Union, 2013⁵²¹

An obvious impact

- 6.1 The use of FLNG technology to develop Australian gas fields will have a significant negative impact upon the construction industry. Prior to the availability of this technology, producing LNG required immense onshore gas processing and liquefaction plants. The construction of these plants provided domestic work opportunities for tens of thousands of people in Australia. By contrast, there is little or no domestic construction phase associated with an Australian FLNG project.
- 6.2 While it is difficult to fully appreciate the economy-wide benefit derived from the construction of onshore LNG plants, some insight into this benefit can be gained from a broad consideration of the work that goes into these projects. Therefore, this chapter begins by placing the scale of an onshore LNG plant construction project into context. Following this, the recent history of these construction projects in Western Australia (WA), as well as in Darwin and Queensland is considered. The extent to which flow-on benefits generated by these projects might be measured is also assessed.
- 6.3 Attention then shifts to consider the employment opportunities that will be generated for Australian residents when FLNG vessels are deployed to develop Australian natural gas reserves in waters off the WA coastline. Included within this assessment, which is largely based upon data provided by Shell Australia on the actual operational requirements of their Prelude project, is a consideration of the current legal landscape pertaining to industrial relations for the offshore resources industry, particularly in the wake of the amendment to the *Migration Act 1958* (Cth) (Migration Act) and the provisions and application of the *Fair Work Act 2009* (Cth) (FW Act) to offshore resources projects.

521 Mr Stephen Price, Secretary, The Australian Workers' Union, *Transcript of Evidence*, 1 November 2013, p 2.

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- 6.4 FLNG projects will require logistical support and servicing from onshore supply bases, and the construction requirements for these supply bases is also explored. The chapter closes with an acknowledgement that while FLNG technology represents both a paradigm shift and a significant challenge to the Australian construction sector, the inevitability of future brownfield investment means that this challenge has been accelerated, rather than created, by FLNG technology.

Megaprojects

- 6.5 Constructing an onshore plant with the capacity to produce exportable quantities of LNG is, by definition, a massive undertaking. There are currently three onshore LNG export plants operating in Australia, with a further six under construction. Each of these projects easily surpasses the definition of a 'mega-project,' a term used by Harvard academics Alan Altshuler and David Luberoff to describe large-scale investment projects costing in excess of \$US1 billion.⁵²² In fact, Chevron's Gorgon project, with an estimated capital cost of \$54 billion, is the largest construction project ever undertaken in world history.⁵²³
- 6.6 The construction phase for an onshore LNG plant is a multi-year undertaking, consisting of large-scale site works—the North West Shelf gas plant in Karratha, for example, covers an area that is approximately 200 hectares in size—followed by the manufacture and onsite assembly of numerous complex components.⁵²⁴ Although there is no typical or standard LNG plant, the major elements that are found in most LNG plants include:
- a feed gas handling and treating section;
 - a liquefaction section;
 - a refrigerant section;
 - a fractionation section;
 - an LNG storage section;
 - a marine and LNG loading section; and
 - a utility and offsite section.⁵²⁵
- 6.7 The contemporary method for constructing each of these elements essentially involves the assembly of modular componentry, which is generally conveyed to the chosen site in pre-fabricated form. Before any of this construction can begin the chosen site will

522 Altshuler, Alan and Luberoff, David, *Mega-projects: The changing politics of urban public investment*, The Brookings Institute, Washington D.C., 2003, p 2.

523 Deutsche Bank Markets Research, *Gorgon & the global LNG monster*, 17 September 2012, p 1.

524 Woodside Petroleum, *Offshore production facility: Karratha gas plant*. Available at: <http://www.woodside.com.au/Our-Business/North-West-Shelf/Onshore-Production-Facility/Pages/default.aspx>. Accessed on 2 March 2014.

525 Kotzot, Heinz, Durr, Charles, Coyle, David and Caswell, Chris, *LNG liquefaction—not all plants are created equal*. Available at: <http://www.kbr.com/newsroom/publications/technical-papers/lng-liquefaction-not-all-plants-are-created-equal.pdf>. Accessed on 2 March 2014.

require some preparation, the extent of which is generally determined by the specific geographic features of the location.

- 6.8 Such a brief description of the tasks involved in the construction of an onshore LNG plant greatly belies their scale. While natural gas is difficult and expensive to produce, it is even more difficult and expensive to export. Indeed, the price of a single LNG carrier (a small link within what is a vast chain of requisite infrastructure) is typically in the region of US\$250 million.⁵²⁶ To ameliorate the capital cost of producing LNG for export, these projects largely rely upon achieving significant economies of scale. This is illustrated by the ConocoPhillips-operated Darwin LNG plant. Though this 3.6 million tonnes of LNG per annum (mtpa) facility is Australia's smallest LNG plant, it is able to produce and export more natural gas in one year than is consumed by the entire state of New South Wales.⁵²⁷
- 6.9 Another illustration of the scale of LNG export projects can be seen by comparing Australia's newest operational LNG export plant—Woodside's Pluto plant—with the nearby Energy Developments domestic LNG plant. In July 2013 the Committee undertook a site tour of the Energy Developments facility, which is located just south of Karratha. This facility operates around the clock to produce about 120 tonnes of LNG each day.⁵²⁸ As there is no northern pipeline infrastructure, this LNG is then carried over land to supply the Broome, Derby, Halls Creek and Fitzroy Crossing power stations within the West Kimberley Power Project (WKPP).⁵²⁹ The WKPP supplies electricity to more than 27,000 people in the Kimberley, with the vast majority of this electricity generation fuelled by Energy Developments' LNG.⁵³⁰
- 6.10 Just north of the Energy Developments facility, somewhere in the vicinity of 65,000 tonnes of LNG produced by the Pluto plant is intermittently loaded into one of the four LNG carriers in the Pluto fleet. At its typical level of output, it would take the Energy Developments plant about two years to fill one of these vessels. The Pluto plant takes about five days to produce this amount.

526 Hall, Simon, 'Asian LNG tanker builders vie for market share,' *The Wall Street Journal*, 20 December 2013. Available at: <http://online.wsj.com/news/articles/SB10001424052702304866904579269290895618508>. Accessed on 2 March 2014. Woodside's Pluto plant, for example, is serviced by four LNG carriers.

527 According to the *Gas market report: October 2013*, published by the Bureau of Resources and Energy Economics, the state of New South Wales consumed about 155 PJ of natural gas in 2012. The Darwin LNG plant has the capacity to produce 3.6 mtpa of LNG which, at ISO 8943, is somewhere in the vicinity of 185 PJ of natural gas.

528 The plant has the capacity to produce 200 tonnes of LNG per day.

529 Energy Developments Limited, *Broome power station fully operational*, 21 January 2008. Available at: http://www.energydevelopments.com.au/_dbase_upl/20080121_ENE-BroomePowerStationFullyOperational.pdf. Accessed on 14 February 2014.

530 Energy Developments Limited, *West Kimberley Power Project*. Available at: http://www.energydevelopments.com.au/01_cms/details.asp?ID=92. Accessed on 14 February 2014.

Recent projects

- 6.11 Since construction of the Pluto plant commenced in late 2007, positive Final Investment Decisions (FIDs) have been taken on three subsequent onshore LNG projects that will produce conventional gas from fields off the coast of WA. Construction of the Pluto project was completed in 2012, and it is expected that construction on the initial phases of the Gorgon, Wheatstone and Icythys projects will be completed by 2015, 2016 and 2017 respectively.⁵³¹ To appreciate the significance of these construction projects, it is useful to consider them in turn. Consideration is also given to the Curtis Island LNG plants and the Browse James Price Point LNG concept.

Pluto

- 6.12 The newest operating LNG plant in Australia, Woodside's Pluto LNG plant is located adjacent to the North West Shelf plant on the Burrup Peninsula, which is on the outskirts of Karratha. After a positive FID to develop the plant was taken in 2007, construction began in November 2007. Though it was initially expected to be completed by 2010, it was not until May 2012 that the first LNG cargo was shipped.⁵³² That is, the Pluto plant was constructed over the course of four years. The initial budget approved by Woodside's Board in July 2007 was \$11.2 billion, excluding compression and tie-in of the Xena field. This was in also in addition to the \$796 million which had already been expended on the Pluto field and the LNG project.⁵³³ By the time Pluto was completed, \$14.9 billion had been spent on the project.⁵³⁴

531 Graham, Chris, 'Shaping Australia's Gas Future,' Paper presented at the Wood Mackenzie Perth Energy Forum 2013, Perth, 25 November 2013.

532 Lawson, Rebecca, 'Woodside Petroleum fires with its first Pluto gas,' *Perth Now*, 30 April 2012. Available at: <http://www.perthnow.com.au/business/woodside-fires-with-its-first-pluto-gas/story-e6frg2r3-1226342764614>. Accessed on 14 February 2014.

533 *Woodside approves Pluto LNG project*, ASX Announcement, Woodside Petroleum Ltd, Perth, 27 July 2007. Available at: <http://www.woodside.com.au/Investors-Media/Announcements/Documents/27.07.2007%20Woodside%20Approves%20Pluto%20LNG%20Project.pdf>. Accessed on 3 April 2014.

534 Stewart, Robb, 'Fitch warns on LNG projects as Woodside firms on Pluto,' *The Australian*, 19 January 2012. Available at: <http://www.theaustralian.com.au/business/mining-energy/fitch-warns-on-lng-projects-as-woodside-firms-on-pluto/story-e6frg9df-1226248345411>. Accessed on 14 February 2014.

Figure 6.1: Woodside's Pluto LNG plant.⁵³⁵



- 6.13 The plant produces gas from the Pluto and Xena gas fields, which are about 190 kilometres offshore in the Carnarvon Basin. A single-train facility with the capacity to produce 4.3 mtpa, about 2,500 kilometres of steel cable and 200,000 cubic metres of concrete went into constructing the Pluto plant. Offshore, five subsea wells feed into a single, 15,000 tonne offshore platform. Gas is conveyed from the platform to the Pluto plant via a 36-inch, 180 kilometre trunkline.⁵³⁶
- 6.14 According to Woodside, during construction the Pluto project 'generated more than 15,000 Australian jobs and made a significant contribution to the Western Australian and Australian economies.'⁵³⁷ At the peak of the project's construction phase in 2010, almost 3,000 construction workers were engaged in on-site work.⁵³⁸

Gorgon

- 6.15 Chevron took a positive FID to proceed with its Gorgon project in September 2009 and construction work on the Barrow Island LNG plant began soon thereafter. A total of 18 subsea wells will produce gas from the Jansz-lo and Gorgon fields. It is expected that the Gorgon project will supply LNG internationally and natural gas to the domestic

⁵³⁵ Woodside Petroleum, *Image gallery*. Available at: <http://www.woodside.com.au/investors-media/resources/pages/image-gallery.aspx>. Accessed on 14 April 2014.

⁵³⁶ Woodside Petroleum, *Woodside investor site tour*, 29 May 2012. Available at: <http://www.woodside.com.au/Investors-Media/Announcements/Documents/29.05.2012%20Woodside%20Investor%20Site%20Tour.pdf>. Accessed on 14 February 2014.

⁵³⁷ Woodside Petroleum, *Pluto LNG*. Available at: <http://www.woodside.com.au/Our-Business/Pluto/Pages/default.aspx>. Accessed on 14 February 2014.

⁵³⁸ Bennett, Cortlan, 'Woodside expects legal action,' *The Sydney Morning Herald*, 27 January 2010. Available at: <http://news.smh.com.au/breaking-news-national/woodside-expects-legal-action-20100127-myib.html>. Accessed on 14 February 2014.

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market from 2015. As such, the Gorgon plant is at least a five-and-a-half year construction project. The plant consists of a three-train LNG facility with an output capacity of 15.6 mtpa, and a two-train domestic gas facility with an output capacity of 300 TJ per day.⁵³⁹ More than 250,000 tonnes of fabricated steel is required for the Gorgon project,⁵⁴⁰ and more than 150,000 tonnes of poured concrete is needed for the loading jetty alone.⁵⁴¹ It is currently estimated that the project budget will amount to \$54 billion.⁵⁴²

Figure 6.2: Chevron-operated Gorgon project LNG plant construction site.⁵⁴³



6.16

Owing to the class A nature reserve status of Barrow Island, the Gorgon project is unique in many ways. LNG will be loaded into carriers at the end of a 2.1 kilometre jetty, while gas for the domestic market, after having been refined at the Gorgon plant, will be conveyed through a 90 kilometre subsea pipeline to the mainland, where it will be fed into the Dampier to Bunbury Pipeline (DBP). Furthermore, instead of simply

539 Chevron, *Gorgon project overview*, January 2014. Available at: <http://www.chevronaustralia.com/docs/default-source/default-document-library/fact-sheet-gorgon-project-overview--jan-2014.pdf?sfvrsn=0>. Accessed on 17 February 2014.

540 Chen, David, 'Australian steelmakers snubbed by Gorgon: industry group,' *ABC News*, 15 September 2009. Available at: <http://www.abc.net.au/news/2009-09-15/australian-steelmakers-snubbed-by-gorgon-industry/1429872>. Accessed on 3 March 2014.

541 Chevron, *Gorgon project activity at the AMC*, 11 November 2010. Available at: http://www.chevronaustralia.com/docs/default-source/default-document-library/amc_stakeholder_forum.pdf?sfvrsn=0. Accessed on 3 March 2014.

542 Macdonald-Smith, Angela, 'Chevron's Gorgon LNG costs climb to \$US54bn,' *Australian Financial Review*, 13 December 2013, p 15.

543 Image supplied by Chevron.

venting it into the atmosphere, carbon dioxide removed from the raw gas stream will be injected and stored into a deep natural reservoir unit located two kilometres beneath Barrow Island. This process—the largest carbon sequestration project ever undertaken—will reduce greenhouse gas emission from the project by approximately 40 per cent.⁵⁴⁴

- 6.17 The Managing Director of Chevron Australia, Mr Roy Krzywosinski, gave the Committee some context to the construction requirements of the Gorgon project:

The Gorgon project, located on Barrow Island, has been under construction for nearly four years now and is more than two-thirds complete. The first LNG cargo and the start of domestic gas supply is currently planned for 2015... Gorgon to date has committed more than \$20 billion worth of work to Australian industry, of which more than 90 per cent has been committed to WA vendors and suppliers.

*During the construction phase, the Gorgon project has created jobs for more than 10 000 people around Australia. This includes more than 6 000 people working on and around Barrow Island because there is a big offshore element, so we have people working on the marine side.*⁵⁴⁵

- 6.18 While the scale of the Gorgon project is unparalleled, it must also be recognised as atypical. The quarantine requirements associated with building on a class A nature reserve are stringent, and the associated carbon sequestration project is unique. This was best articulated by Mr Steve McCartney of the AMWU, who explained that while there are about 6,000 people working on Barrow Island, not all are involved in construction:

I would love to say it was 6 000 construction people, but I do not think that would be fair. You would be looking at around 4 500 jobs in construction. There are 6 000 jobs in Gorgon because of the unusual nature of the way it is built because of the environmental stuff. There are a whole heap of jobs for caretaking components for six or nine months before they are allowed on the island.

544 Chevron, *Gorgon project overview*, January 2014. Available at: <http://www.chevronaustralia.com/docs/default-source/default-document-library/fact-sheet-gorgon-project-overview--jan-2014.pdf?sfvrsn=0>. Accessed on 17 February 2014.

545 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 2.

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- 6.19 Mr McCartney then gave an example of the way in which the quarantine requirements had impacted upon the project:

*...they have to wrap [the components] up. They wash them down, cover them up and store them for nine months. They do that in the sand as well... They had to raise the pad 800 [millimetres] and they imported all the sand and then they had to sit the sand on the beach for six months to prove that it did not have bugs in it...*⁵⁴⁶

- 6.20 While it is clear that the construction requirements of the Gorgon project have been and continue to be immense, it would be unrealistic to view the Gorgon project as exemplifying a typical LNG plant construction project. What the Gorgon project does demonstrate, however, is that every LNG project is a unique and challenging undertaking.

Wheatstone

- 6.21 Two years after deciding to proceed with the Gorgon project, Chevron took a positive FID on their Wheatstone project in September 2011. Construction on the project, which will produce LNG for export and natural gas for the domestic market from numerous gas fields, began in December 2011. It is expected that the Wheatstone project will produce its first gas by the end of 2016. The first phase of the project—a two-train, 8.9 mtpa LNG facility and a separate 200 TJ per day domestic plant—is at least a five-year construction effort. It must also be noted that the Wheatstone project has approval to produce up to 25 mtpa of LNG, indicating that it has been built with an eye to the future. The budget for the first phase of the Wheatstone project is \$29 billion, and Mr Krzywosinski informed the Committee that, in October 2013, the project was within its ‘overall budget schedule and key milestone targets.’⁵⁴⁷

546 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers’ Union, *Transcript of Briefing*, 28 June 2013, p 8.

547 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 3.

Figure 6.3: Chevron-operated Wheatstone project LNG plant construction site.⁵⁴⁸



6.22 Mr Krzywosinski explained that the Wheatstone project construction phase, while not on the scale of the Gorgon project, was nonetheless an extensive undertaking:

*The Wheatstone project located at Ashburton North near the town of Onslow has been under construction for almost two years. The first LNG cargo was planned for late 2016... Wheatstone, to date, has committed more than \$11 billion worth of contracts and purchase orders to Australian businesses, of which more than \$9 billion to date have been awarded to WA businesses... We are currently in construction on the project, as I mentioned, and more than 3 000 people are working on site and another 6 500 direct and indirect jobs will be created during peak construction.*⁵⁴⁹

6.23 While Mr Krzywosinski pointed out that there are currently ‘more than 3000 people... working on site’ on the Wheatstone project, it is generally the case that peak construction of an LNG project begins when the project is about two-thirds complete. In the case of the Wheatstone project, this is scheduled to occur towards the end of 2014. The Committee notes that the Wheatstone accommodation complex was built to

548 Chevron, *Image downloads*. Available at: <http://www.chevronaustralia.com/news/image-downloads>. Accessed on 7 May 2014.

549 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, pp 2-3.

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house more than 4,300 construction workers, and regards this figure as a reasonable forecast of the peak construction requirements of the project.⁵⁵⁰

Ichthys

- 6.24 After selecting Darwin as the site for its first LNG plant in September 2008, Japanese petroleum company INPEX took a positive FID to proceed with the \$34 billion Ichthys project in January 2012. The project will see gas from the Ichthys field in the Browse Basin piped via a 42-inch, 889 kilometre trunkline to what will initially be a two-train, 8.4 mtpa capacity LNG plant on the outskirts of Darwin. Above the field, the project will be supported by the world's largest semi-submersible offshore platform. All condensate will be processed offshore via a single floating production, storage and offloading (FPSO) vessel.
- 6.25 Site works in Darwin began in May 2012, and the project is planned for completion by the end of 2016—a four-and-a-half year construction timeframe.⁵⁵¹ According to INPEX's General Manager, External Affairs and JV, Mr William Townsend, at peak construction the workforce for the Ichthys LNG plant will be 'over 4 500.'⁵⁵²

Curtis Island

- 6.26 In Queensland, three adjacent LNG plants are currently under construction on Curtis Island. As these plants will produce LNG from land-based coal seam gas deposits, they are not truly comparable to onshore plants that produce gas from conventional, offshore gas fields. Furthermore, FLNG technology is not an alternative to their existence. Nevertheless, the plants themselves are essentially identical in scope to the onshore LNG plants in Western Australia and the Northern Territory. As such, their construction requirements provide useful metrics for considering the impact of FLNG technology as an alternative to onshore LNG plants.
- 6.27 Though each of the three plants will be operated by different companies, contracts for the construction of all three projects were won by construction and engineering firm Bechtel. Across the three projects, a total of six trains will have the capacity to produce about 24 mtpa.⁵⁵³ Construction began on the first of the three projects in 2010, and on

550 LNG Journal, *Chevron breaks ground on \$29Bln Wheatstone project in Australia*. Available at: [http://www.lngjournal.com/lng/index.php/home-mainmenu-1/item/2425-chevron-breaks-ground-on-us\\$29bln-wheatstone-project-in-australia](http://www.lngjournal.com/lng/index.php/home-mainmenu-1/item/2425-chevron-breaks-ground-on-us$29bln-wheatstone-project-in-australia). Accessed on 17 February 2014.

551 Gas Today, *Ichthys construction officially begins*, 18 May 2012. Available at: http://gastoday.com.au/news/ichthys_construction_officially_begins/069319/. Accessed on 17 February 2014.

552 Mr Bill Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 9.

553 Agius, Kim, 'Premier marks milestone for Curtis Island LNG plant,' *Brisbane Times*, 18 February 2014. Available at: <http://www.brisbanetimes.com.au/queensland/premier-marks-milestone-for-curtis-island-lng-plant-20140218-32yc9.html>. Accessed on 2 March 2014.

the second and third projects in 2011.⁵⁵⁴ It is expected that construction on the first project will be complete by the end of 2014, and that all three projects will be completed by 2015. Essentially, then, each plant is a four year construction project.⁵⁵⁵

6.28 Originally Bechtel had forecast that ‘at [combined] peak construction, the workforce will be 8,800 strong.’⁵⁵⁶ By December 2013, however, it had become apparent that this forecast was inadequate as more than 10,000 people were working across the three projects.⁵⁵⁷

Browse

6.29 Following two years of Front End Engineering and Design (FEED) work, in April 2013 plans for an onshore LNG plant at James Price Point were abandoned by Woodside. In the two years leading up to this decision, however, the FEED work that had been undertaken included somewhat detailed workforce planning calculations as a part of determining whether and how to develop what are significant gas fields.

6.30 Woodside’s workforce planning was drawn upon in an August 2011 consultant’s report commissioned to provide some insight into how the proposed Browse development might impact upon the Broome economy. That report drew upon ‘low and high workforce scenarios,’ for onshore and offshore construction activities that had been provided by Woodside.⁵⁵⁸

6.31 The proven and probable reserves contained in the Browse project’s Brecknock, Calliance and Torosa fields are somewhere in the order of at least 16 trillion cubic feet of natural gas—more than five times the size of the resources that will be developed by the Prelude project. Accordingly, the consultants’ report pertaining to the project envisaged an initial three-train LNG plant, with a production capacity of 12 mtpa. As such ‘[t]he construction phase of the [Browse] Development [was] estimated to have an average onshore and offshore workforce of between 3,046 and 4,738 with a peak workforce of from 6,340 to 9,860.’⁵⁵⁹ These figures are broadly in line with estimates

554 The first is the QGC QCLNG project; the Origin Energy/ ConocoPhillips-operated APLNG project is the second, and the Santos-operated GLNG project is the third.

555 Agius, Kim, ‘Premier marks milestone for Curtis Island LNG plant,’ *Brisbane Times*, 18 February 2014. Available at: <http://www.brisbanetimes.com.au/queensland/premier-marks-milestone-for-curtis-island-lng-plant-20140218-32yc9.html>. Accessed on 2 March 2014.

556 Bechtel, *Curtis Island LNG projects*. Available at: http://www.bechtel.com/curtisland_lng.html. Accessed on 2 March 2014.

557 Validakis, Vicky, ‘What it takes to build \$70 billion worth of LNG plants: Bechtel construction facts,’ *Australian Mining*, 9 December 2013. Available at: [http://www.miningaustralia.com.au/features/what-it-takes-to-build-\\$70-billion-worth-of-lng-pl](http://www.miningaustralia.com.au/features/what-it-takes-to-build-$70-billion-worth-of-lng-pl). Accessed on 18 February 2014.

558 Woodside Energy Limited, Electronic mail, 11 February 2014. The Committee appreciates that the numbers in this report were forecasts. Notwithstanding this, the figures are reasonably comparable with the projects of similar scope that are presently under construction.

559 *ibid*.

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published in November 2010 by the Department of State Development (DSD), which explained that 'it is estimated that the initial construction phase of the Precinct will take four to six years and employ about 6,000 personnel.'⁵⁶⁰ By February 2013, the Department had revised this figure, and was forecasting that 8,000 construction jobs would be generated by an onshore Browse LNG project.⁵⁶¹

6.32 However accurate the forecasted workforce figures for the proposed James Price Point development may or may not have been, there is no doubt that constructing a new onshore LNG plant in a greenfield location to develop the Browse fields would have been a vast undertaking, creating thousands of construction work opportunities over a period of several years. If instead the fields are developed using FLNG technology, these construction opportunities will not eventuate.

Finding 34

The construction of an onshore gas processing and liquefaction plant at James Price Point would create thousands of construction jobs lasting several years. If the Brecknock, Calliance and Torosa gas fields are developed using FLNG technology, these jobs will not eventuate.

6.33 Table 6.1 provides a summary of construction requirements for the above projects, including forecast requirements for the Browse project.

Table 6.1 Summary of LNG project construction requirements

Project	Groundbreaking	Plant LNG production capacity	Peak construction workforce	Construction duration
Pluto	November 2007	4.3 mtpa (1 train)	3,000	4 years
Gorgon	December 2009	15.6 mtpa (3 trains)	6,000 (4,500 construction)	6 years
Wheatstone	December 2011	8.9 mtpa (2 trains)	4,300	5 years
Ichthys	May 2012	8.4 mtpa (2 trains)	4,500	4.5 years
Browse (forecast)		12 mtpa (3 trains)	6,000 ~ 8,000	~ 6 years

560 Department of State Development, *Browse LNG Precinct Strategic Assessment Report*, November 2010. Available at: http://www.dsd.wa.gov.au/documents/browse_SAR_fact_sheet_2.pdf. Accessed on 2 March 2014.

561 Submission No. 8 from the Australian Manufacturing Workers' Union, 30 August 2013, p 5.

Flow-on benefits?

6.34 The direct benefit derived from construction industry activity within an economy generally serves as an important form of stimulus for wider economic growth. A current example of this is the level of economy-wide growth that has been experienced in the Northern Territory as a consequence of the Ichthys plant construction project.

6.35 In September 2013 the Northern Territory Government published the *Territory economic review*, which contained a summary of the impact of construction activity in the Northern Territory in 2012–2013. According to the *Review*:

the construction industry is an important contributor to the Territory economy, accounting for a higher than national average proportion of gross state product (GSP) and employment. The construction industry contributed 11.6 per cent of Territory GSP in 2011–12, and accounted for 10.3 per cent of the Territory's resident employment. The construction industry's contribution to the Territory economy and employment is expected to increase over the coming years, as work on major projects accelerates.

In 2012–13, the total value of construction work done in the Territory increased by 55.2 per cent to \$5.1 billion, the highest annual total on record by a significant margin. Growth was primarily driven by engineering construction, which was up by 83.4 per cent to \$3.5 billion and accounted for nearly 70 per cent of the total value of Territory construction activity in 2012–13. This was due to major projects in the Territory including work on the INPEX Ichthys liquefied natural gas project, the development of the Montara oilfield, expansions at major mine sites and construction work on the marine supply base.⁵⁶²

6.36 This construction activity saw the Northern Territory's GSP grow by an estimated 4.6 per cent in 2012–2013, on the back of 4.4 per cent growth the year prior. In 2012–2013, the Northern Territory (NT) economy grew about 50 per cent faster than the broader Australian economy.⁵⁶³ While it is true that the relatively small size of the NT economy meant this percentage growth was modest in real terms, the recent performance of the NT economy is nonetheless impressive.⁵⁶⁴

562 Northern Territory Government, *Territory economic review*, September 2013. Available at: <http://www.treasury.nt.gov.au/PMS/Publications/Economics/TerritoryEconomicReview/I-TER-1309-I01.docx>. Accessed on 2 March 2014.

563 Northern Territory Government, *Northern Territory key business statistics*, June 2013. Available at: http://www.dob.nt.gov.au/business/economics/key-statistics/Documents/nt_key_stats_jun_2013.pdf. Accessed on 3 March 2014.

564 Australian Bureau of Statistics, *5220.0—Australian national accounts: State accounts*, November 2013. Available at:

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6.37 Many of the submissions made in the course of this Inquiry argued that the thousands of construction jobs generated by a single LNG plant construction project represented an important source of general economic growth, and made specific reference to the economic phenomenon known as the multiplier effect.⁵⁶⁵

6.38 In economics, a multiplier is a factor of proportionality that measures the extent to which one variable changes as a result of a change in some other variable.⁵⁶⁶ The 'multiplier effect' is used by some economists to describe, for example, changes in the money supply as a consequence of a change in the monetary base ('the monetary multiplier'), or the effect of a change in fiscal policy upon a country's gross domestic product ('the fiscal multiplier').

6.39 Chair of the Harvard University Department of Economics, N. Gregory Mankiw, gives a succinct description of the function of the fiscal multiplier. According to Mr Mankiw, the fiscal multiplier model predicts that 'each dollar of government spending can increase the nation's gross domestic product by more than a dollar,' because:

*when higher government spending increases G.D.P., consumers respond to the extra income they earn by spending more themselves. Higher consumer spending expands aggregate demand further, raising the G.D.P. yet again. And so on. This positive feedback loop is called the multiplier effect.*⁵⁶⁷

6.40 The multiplier effect is also sometimes used to describe how the creation of a direct employment opportunity functions to create a number of subsequent indirect employment opportunities. In a fact sheet entitled 'Western Australia's resources industry,' for example, the Department of Mines and Petroleum (DMP) states that:

generally it is calculated that every job created in the mining and petroleum industry will create three more in other sectors.

These extra jobs are created in retail (clothing, supermarkets), hospitality (hotels, restaurants), support services (IT, administration) and manufacturing (machinery, parts).

As a result, in 2011–12 the industry was indirectly responsible for employing an estimated total of 422,300 people in Western Australia

[http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/154DF709B44199D0CA257C3000115973/\\$File/52200_2012-13.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/154DF709B44199D0CA257C3000115973/$File/52200_2012-13.pdf). Accessed on 3 April 2014.

565 Submission No. 8 from the Australian Manufacturing Workers' Union, 30 August 2013, p 6; and Submission No. 22 from the Maritime Union of Australia, 3 September 2013, p 6.

566 Mankiw, N. Gregory, *Principles of Economics 6th Ed*, Cengage Learning, 2011.

567 Mankiw, N. Gregory, 'Is government spending too easy an answer?', *The New York Times*, 10 January 2009, p BU6.

*[there being 105,581 persons directly employed within the WA mining and petroleum industry].*⁵⁶⁸

6.41 Applying this logic to the DSD's forecast of 8,000 construction jobs associated with an onshore Browse project, the Australian Manufacturing Workers' Union (AMWU) submitted that 'the decision to move [the Browse project] to a floating facility means 32,000 fewer jobs in Western Australia.'⁵⁶⁹

6.42 The Committee expresses caution as to the notion every job created within some part of the mining or petroleum industry will lead to the creation of three other jobs elsewhere. While it is certainly true that job creation is an unrivalled form of economic stimulus, economics is necessarily an inexact science. That is, while there can be no doubt that LNG plant construction creates many thousands of indirect employment opportunities, putting a specific figure to these opportunities is effectively impossible, as there are simply too many variables that must be drawn into the calculation.

6.43 This was articulated by Mr Krzywosinski in discussing the extent to which Chevron had been able to quantify the flow-on benefit to the Western Australian economy of the Gorgon and Wheatstone projects. According to Mr Krzywosinski, Chevron:

*personally, do[es] not do a lot of research; we have worked with other consultants and they have different ways of doing it. The feedback we get is anywhere between two times and four times the number. I know that is not an exact science. We have tried to do a similar exercise for construction. It is a big number; one that can be quickly criticised. But there is no doubt that there is a multiplier effect; there is no doubt about that. The question is how big it is—I do not know.*⁵⁷⁰

6.44 The Committee also sought input on the value of relying upon the employment multiplier effect to forecast flow-on benefits of megaprojects from the Chief Economist of the Chamber of Commerce and Industry of Western Australia (Inc) (CCIWA), Mr John Nicolaou. Mr Nicolaou's response was telling:

The CCI does not subscribe to the use of multipliers. They can be used and abused, to be frank, and so we never really invest any of our time

568 Department of Mines and Petroleum, *Western Australia's resource industry*. Available at: http://www.dmp.wa.gov.au/documents/132431_Resource_Industry_Fact_Sheet.pdf. Accessed on 2 March 2014.

569 Submission No. 8 from the Australian Manufacturing Workers' Union, 30 August 2013, p 6.

570 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 5.

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*and capacity in trying to build multipliers up in terms of what value certain industry sectors have to the broader economy.*⁵⁷¹

6.45 Again, there is no doubt that LNG plant construction provides economic stimulus in the form of direct and indirect employment. Nevertheless, given the imprecise nature of multiplier calculations, the Committee's focus is on the direct employment figures as measure of this stimulus. Furthermore, it is incorrect to suggest that flow-on benefits are only derived from onshore LNG plant construction projects. FLNG technology will generate direct and indirect employment opportunities in a variety of sectors, and these opportunities must be considered in any attempt to evaluate the impact of FLNG technology.

6.46 Notwithstanding the Committee's position on the accuracy of multipliers, it must be noted that multipliers are often used as an industry standard.

Operational requirements

6.47 Where FLNG technology is used as an alternative to a greenfield onshore LNG project, there is a clear negative impact upon the local construction sector. Once deployed, however, FLNG vessels will require significant operational support. Throughout this Inquiry it has been submitted by FLNG proponents that the operational requirements of FLNG vessels will generate numerous employment opportunities for Australian residents. In fact, operational opportunities generally were the only opportunities that project proponents put forward in evidence.

6.48 Submissions were broadly in line with the sentiment expressed by a consultants' study, quoted within a submission made by the Australian Petroleum Production and Exploration Association (APPEA), that:

*while the benefits that accrue to the Nation during the construction phase are important, a project's construction phase typically lasts only a few years. The focus should be on the very significant benefits that accrue over the life of the projects, which is between 25 and 50 years at a minimum and likely longer as the projects expand.*⁵⁷²

6.49 According to APPEA, opportunities for local workers during the operations phase of an FLNG project include:

the employment of a skilled local workforce to operate and maintain the offshore facility; the provision of aviation, drilling and marine

571 Mr John Nicolaou, Chief Economist, Chamber of Commerce and Industry of Western Australia (Inc), *Transcript of Evidence*, 1 November 2013, p 7.

572 Submission No. 12 from the Australian Petroleum Production and Exploration Association, 30 August 2013, p 17.

*support services out of regional centres; and the provision of supply, accommodation, catering and maintenance services through the establishment of marine supply bases and the engagement of local workshops to provide maintenance services.*⁵⁷³

6.50 In the case of Prelude, Shell explained that:

*in the operations phase, Shell's expectation is that Prelude FLNG will see similar employment benefits to a one train onshore LNG facility, offering long-term, highly skilled positions for a project life of 25 years.*⁵⁷⁴

6.51 Pointing to an independent study undertaken by ACIL Tasman consultants, Shell further explained that '[b]y 2017 there will be 350 people working on Prelude with a further 650 in support roles, across Broome, Darwin and with a majority based in the Perth office.'⁵⁷⁵ These figures were also cited by Shell's Country Chair, Mr Andrew Smith, who explained that:

*Shell has already established Perth as the hub of the company's floating LNG operations for Prelude. We have our project headquarters here in Perth, employing more than 500 staff, which will increase towards 1 000 over the coming few years.*⁵⁷⁶

6.52 These figures were also echoed in a submission made by Woodside Petroleum, which confirmed that an individual FLNG facility 'will require approximately 350 personnel in steady state operations (across two shifts on a rotating basis),' and that such a figure 'is comparable to a traditional onshore LNG plant in its operational phase.'⁵⁷⁷ Woodside also explained that:

*personnel on board during normal operations will consist of highly trained LNG operators and maintainers, engineers, management, as well as facility maintenance personnel (cleaners, cooks etc).*⁵⁷⁸

6.53 Furthermore, both Shell and Woodside pointed to the fact that FLNG vessels will have a different 'maintenance work profile' to onshore LNG plants, which would see FLNG provide 'more and continuous employment opportunities' compared to onshore plants.⁵⁷⁹ According to Shell:

573 *ibid.*

574 Submission No. 15 from Shell Australia, 30 August 2013, p 11.

575 *ibid.*

576 Mr Andrew Smith, Country Chair, Shell Australia, *Transcript of Evidence*, 23 October 2013, p 2.

577 Submission No. 24 from Woodside Petroleum, 4 September 2013, p 19.

578 *ibid.*

579 Submission No. 15 from Shell Australia, 30 August 2013, p 11.

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*rather than relying on major shutdowns for maintenance, the FLNG philosophy of continued maintenance minimises the scope of major shutdowns by increased routine maintenance effort during normal operations, whilst on-location. This provides a more sustainable and stable basis for support industries to offer long term employment.*⁵⁸⁰

6.54 Woodside quantified this increased maintenance requirement, submitting that '[d]uring periods of major maintenance up to an additional 250-270 [personnel] will be required per facility.'⁵⁸¹ On the basis that FLNG maintenance will be 'more regular when compared to a traditional LNG plant,' Woodside further submitted that FLNG maintenance 'will generate ongoing employment throughout the life of the field.'⁵⁸²

6.55 With Prelude under construction, the figures provided by Shell on the operational requirements of that individual FLNG unit represent the best indication of the number of 'ancillary services' personnel or those involved in all operational requirements of an FLNG vessel. According to Shell, Prelude will generate approximately 1,000 jobs, consisting of 350 maritime roles and a further 650 land-based (and maritime maintenance) support roles. Prelude is expected to operate for a period of about 25 years.

Opportunities for Australian residents?

6.56 Following the public explanation by Shell that the Prelude FLNG project would itself generate a total of 1,000 employment opportunities in Australia, Mr Steve McCartney of the AMWU expressed doubt as to how Shell would be able to meet this commitment. According to Mr McCartney, the AMWU is concerned about:

*how many technicians they have to have on board that have come with the boat and come with the company, and there will be lots of them because it is built in South Korea by a South Korean company. [Samsung Heavy Industries] will have their workers on there, especially for the warranty period and the commissioning stages. Then our debate will be with [Shell], I suspect. How many of those technicians will be Australian jobs and how many of those other jobs will be for Australians trained to get those jobs? We might get a bit of those 1 000 jobs. I cannot honestly tell you how many of the 1 000 jobs that will develop over the next 25 years will come back to us.*⁵⁸³

580 *ibid.*

581 Submission No. 24 from Woodside Petroleum, 4 September 2013, p 19.

582 *ibid.*

583 Mr Steve McCartney, State Secretary (WA), Australian Manufacturing Workers' Union, *Transcript of Evidence*, 1 November 2013, p 5.

6.57 In discussing the operational employment opportunities, Mr Stephen Price of the Australian Workers' Union (AWU) explained that while the view of the AWU is that 'the potential [opportunities] on the construction side is extremely dire,' the Union agrees that 'the potential on the operational side is actually very good.'⁵⁸⁴ Mr Price further explained, however, that the AWU shared similar concerns to those expressed by the AMWU:

*One thing we need to be careful of, of course, is the nationality of the crews on these facilities. There is some question about the application of the Australian industrial jurisdiction, depending on where the resource is. Unfortunately, a case has been going through the Federal Court regarding some Filipinos who were working on a Maersk vessel that we thought was in the economic development zone and should have been covered by Australian regulations, which would have given them a much more significant pay rate... That application by the Fair Work Ombudsman was dismissed this morning. So we are having a look at whether that is appealable or not. But it is concerning...*⁵⁸⁵

6.58 The case referred to by Mr Price, *Fair Work Ombudsman v Pocomwell Limited (No 2)*,⁵⁸⁶ arose from an application by the Fair Work Ombudsman for a declaration (and subsequent associated orders) by the Federal Court of Australia that three companies had contravened certain aspects of the *Fair Work Act 2009* (Cth) (FW Act), in relation to work undertaken on two offshore vessels. Transactions between the companies had resulted in four nationals of the Republic of the Philippines being employed as painters on two drilling rigs operating in Australia's Exclusive Economic Zone (EEZ). The work in question occurred in seas off the coast of WA, but outside Australia's twelve nautical mile territorial limit. In consideration for the work undertaken, Barker J found that the four men had been paid significantly less than they would have been entitled to under Australian law. Accordingly, the decision before the Court was whether or not the FW Act applied in the circumstances.

584 Mr Stephen Price, Secretary, Australian Workers' Union, *Transcript of Evidence*, 1 November 2013, p 6.

585 *ibid.*

586 [2013] FCA 1139.

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6.59 In his judgment, Barker J explained that the FW Act does not ordinarily apply in seas beyond the Australian territorial sea. He also explained in detail, however, that the power to regulate labour relations on board foreign ships engaged in the exploration and exploitation of any natural resources in the EEZ is within Australia's sovereign rights.⁵⁸⁷ He then noted that s 33 of the FW Act explicitly (and successfully)⁵⁸⁸ extends the operation of the Act to seas in the EEZ in certain circumstances, broadly being:

- where work occurs on an Australian ship; or
- where work occurs on a fixed platform (defined in s 12 of the FW as being 'an artificial island, installation or structure permanently attached to the sea-bed'); or
- where work occurs on any ship that operates from an Australian port or uses Australia as a base.

6.60 Furthermore, reg 1.15E of the FW Act extends its application to any ship operating in the EEZ that has a majority Australian crew.

6.61 In dismissing the application made by the Fair Work Ombudsman, the Court determined that neither of the drill rigs could be considered as being 'permanently attached to the seabed,' as they were only ever temporarily so attached.⁵⁸⁹ The Court also determined that the Fair Work Ombudsman had 'failed to establish that, at material times, either rig was a "majority Australian-crewed ship" for the purposes of reg 1.15E.'⁵⁹⁰

6.62 The Committee appreciates the concern expressed by Mr Price in relation to this outcome. Plainly, the facts of the case reflect extremely poorly upon the Western Australian labour hire company that, having won a contract worth \$300 per painter per day, then employed the painters at a rate of \$92 per day.⁵⁹¹

6.63 The judgment should, however, allay concern that an analogous situation could arise in relation to FLNG vessels. It seems almost certain that an FLNG vessel would meet the definition of a 'fixed platform' under s 33(1)(b) (read with s 12) of the FW Act. Shell's Prelude FLNG vessel has been designed to be permanently moored above the Prelude and Concerto fields, and attached to the sea-bed both by a mooring and by flowlines attached to subsea wells. In briefing the Committee on the technology, the General Manager of Shell in Australia, Mr Steve Phimister, explained that Prelude will 'remain there on location for around about 25 years once it is towed to location.'⁵⁹² Therefore,

587 *Fair Work Ombudsman v Pocomwell Limited (No 2)* [2013] FCA 1139, paragraph 97.

588 *ibid*, paragraph 105.

589 *ibid*, paragraph 143.

590 *ibid*, paragraph 235.

591 *ibid*, paragraphs 3-4.

592 Mr Steven Phimister, General Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 5.

it seems that employment conditions on the Prelude vessel will very likely have to accord with the provisions of the FW Act.

6.64 In any event, the fact that FLNG vessels will be attached to the sea bed means that these vessels will, like many existing (and similarly attached) offshore floating and fixed structures, be part of the Australian migration zone, as described in the Migration Act. As a consequence, any person working on an FLNG vessel attached to the Australian continental shelf will either need to be an Australian citizen or else hold a relevant visa enabling them to work in Australia.

6.65 It has been the case since 1982 that the migration zone, and therefore the requirement for non-citizens to hold a visa, has applied to non-citizens working on resources installations attached to Australia's continental shelf. Importantly, the Migration Act provides that resource industry mobile units (whether self-propelling or not) are resource installations when they are attached to the continental shelf or attached to a resource installation which is, itself, attached to the continental shelf.⁵⁹³

6.66 The 2012 decision by the Federal Court of Australia in *Allseas Construction SA v Minister for Immigration and Citizenship*⁵⁹⁴ was that vessels installing offshore pipelines in the EEZ were not operating inside Australia's migration zone and were accordingly not breaching any Australian laws by engaging non-citizens without visas. Following this decision the Federal Parliament amended the Migration Act to clarify the extent of the migration zone. The *Migration Amendment (Offshore Resources Activity) Act 2013* (Cth), which commenced operation on 29 June 2013, amended the Migration Act with the insertion of the following section:

9A Migration zone etc.—offshore resources activities

(1) *For the purposes of this Act, a person is taken to be in the migration zone while he or she is in an area to participate in, or to support, an offshore resources activity in relation to that area.*⁵⁹⁵

6.67 It seems likely that the only reason why a person would be employed upon an FLNG vessel would be to support the operations of that vessel. As such, it seems likely only Australian citizens, or else persons in possession of an appropriate visa, will be able to work on an FLNG vessel in Australia's EEZ. The Committee regards this as an appropriate state of affairs.

593 *Migration Amendment (Offshore Resources Activity) Bill 2013* (Cth). Explanatory Memorandum.

594 [2012] FCA 529.

595 *Migration Amendment (Offshore Resources Activity) Act 2013* (Cth).

Good business sense

- 6.68 The legal requirements notwithstanding, Shell has submitted that it has a strong preference for filling operational roles with local employees because doing so makes good business sense:

*Shell's global experience shows that for the operations phase, developing local support and relationships improves equipment availability in the long term and should ultimately deliver more cost effective and efficient outcomes.*⁵⁹⁶

- 6.69 Shell explained that it 'is committed to employing Australians to work on Prelude FLNG,' and that it had already taken steps that demonstrated this commitment:

Shell Australia has elected to prioritise Australian talent for Prelude FLNG, and has started early with a strategy of hiring more experienced staff first to support the project delivery, followed by a series of recruitment waves until the start of operations...

*There are currently 60 Australians already working in the Prelude FLNG operations organisation. Most new employees will spend approximately two years working in the construction yard in South Korea, before returning to Perth for start-up and operations. Some employees will also be posted to other Shell projects around the world to gather vital operations experience prior to [Prelude] start-up.*⁵⁹⁷

- 6.70 Shell's commitment to employing Australian residents as Prelude operators was also demonstrated in September 2013, when news broke of a multi-year agreement being reached between Shell and the Challenger Institute of Technology. The partnership will see Shell and Challenger jointly develop training programs for FLNG operators, which will be delivered at Challenger's Australian Centre for Energy and Process Training (ACEPT). Announcing the four-year agreement, Shell Australia Asset Manager (Prelude), Mr Jim Marshall, said that Shell was 'pleased that through Prelude [it had] the opportunity to train our people locally, where our Prelude operations team will be based.'⁵⁹⁸

596 Submission No. 15 from Shell Australia, 30 August 2013, p 11.

597 *ibid*, p 12.

598 Gomez, Kevin, 'Shell and Challenger to train technicians for floating LNG facility,' *Process and Control Engineering*, 23 September 2013. Available at: <http://www.pacetoday.com.au/news/shell-and-challenger-to-train-technicians-for-floa>. Accessed on 3 March 2014.

Beyond Prelude?

- 6.71 In its submission, Shell extrapolated the personnel requirements for Prelude to provide a forecast for the economic benefits—including the employment opportunities—that might be generated in WA if multiple FLNG units are deployed to develop natural gas fields off the state’s coastline. The estimated employment opportunities generated by three and by six FLNG units were estimated by Shell in the following terms:

Table 6.1: Direct and indirect jobs created by FLNG units

	3 FLNG units		6 FLNG units	
	Australia (including WA)	WA only	Australia (including WA)	WA only
Direct project jobs	1,000–1,500	750–1,150	2,000–3,000	1,500–2,200
Indirect/support project jobs	3,500–4,700	1,900–2,500	7,000–9,400	3,800–5,000

- 6.72 Though these numbers might serve as a useful guide, they should be treated with a degree of caution. In particular, although it is clear that additional FLNG units will create additional employment opportunities, it is not clear whether these additional opportunities will increase exactly in line with the number of additional FLNG units.

Supply base construction

- 6.73 Similar to other offshore petroleum industry installations, operational FLNG units will require support and supplies from strategically-located, onshore supply bases. Though construction of these supply bases is not on the same scale as constructing onshore LNG plants, supply base construction is still a significant undertaking.
- 6.74 In Karratha, the North West Shelf and Pluto LNG projects are supported by the King Bay Supply Base, located about two kilometres south of the adjacent plants and operated by Woodside. The King Bay Supply Base comprises marine facilities and warehouses, which provide logistical support for the shipping and offshore drilling and production operations associated with the projects.⁵⁹⁹

⁵⁹⁹ In July 2013 the Committee was given an overview of the King Bay Supply Base by Ms Alisha Stearne and Ms Michelle Grady of Woodside.

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Figure 6.4: Panorama of the King Bay Supply Base, Karratha.



6.75 Three 2000-tonne supply vessels operate out of the King Bay Supply Base in support of the North West Shelf project's various offshore operations. These vessels carry large payloads of supplies and equipment between the offshore facilities, as well as providing support to various inspection, maintenance and repair operations. They can also be used for fire-fighting and rescue operations.⁶⁰⁰

6.76 Subsequent to the August 2013 announcement by Woodside that it would begin investigating the use of FLNG technology to develop the Browse project, Western Australian Premier, Hon Colin Barnett, MLA, announced that the Western Australian government would seek a commitment by Woodside and its Browse partners to build the project supply base at James Price Point.⁶⁰¹ This resulted in the AMWU submitting that:

*Premier Colin Barnett has raised the idea of using James Price Point as a supply base for future Browse Basin FLNG vessels. While the AMWU believes this is a poor substitute for land based processing, the union supports this measure as a means to salvage some Western Australian economic development from Browse... In the event FLNG is chosen for Browse, we support retaining an obligation for the joint venture partners to use James Price Point in this capacity. Without such an option, it is difficult to see how Western Australia will be able to participate in the economic activity surrounding Browse gas, even the resources that lie within State jurisdiction.*⁶⁰²

6.77 Mr Price of the AWU expressed similar support for a Kimberley supply base project, but warned that any such project would require action from the WA Government:

600 Woodside Petroleum, *Support services*. Available at: <http://www.woodside.com.au/Our-Business/North-West-Shelf/Support/Pages/default.aspx>. Accessed on 4 March 2014.

601 Macdonald-Smith, Angela, and Forrestal, Luke, 'WA Premier pushes Woodside for supply base,' *Australian Financial Review*, 6 August 2013, p 22.

602 Submission No. 8 from the Australian Manufacturing Workers' Union, 30 August 2014, p 8.

*We have an opportunity to at least try to salvage something through the establishment of a centre of excellence and a supply base in Broome at the moment. Once again, there are a lot of people talking but not much action is happening on that, and these things are time critical. It takes time to put infrastructure in place and it takes time to ensure you have the appropriate companies establish or relocate to be able to provide the services that will be required, yet there is nothing being spoken about that actually happening at the moment.*⁶⁰³

6.78 It should be noted that in March 2013, WA construction company Decmil announced that it had won a \$25 million contract to design and construct a supply base in support of Shell's Prelude project. The supply base, which will consist of an administration building and a climate-controlled warehouse, as well as storage yards, hard stands, a wash down pad, roads, and car parks, will be located on Darwin's East Arm Wharf.⁶⁰⁴

6.79 In putting the contract out to tender, Shell described the scope of the required work in the following terms:

*The Supply Base facility shall be of a suitable design and completion to support the Prelude FLNG Facility for the duration of its Operations over 25 years. The completed Supply Base facilities in Darwin will need to perform all Logistic and Materials Management functions to be expected in the support of a large Offshore Oil and Gas facility of North Western Australia.*⁶⁰⁵

6.80 The work package also specified that:

*the land for the Supply Base is approximately 5 ha in area and is to be located in the East Arm Industrial Area in Darwin. The design foot print should include of [sic] setbacks, driveways, landscaping, road and turning areas.*⁶⁰⁶

6.81 The Committee believes that the land at James Price Point provides an opportunity for a bigger supply base than Darwin, an emergency response facility, helicopter support facilities and, ultimately, fabrication and maintenance support.

603 Mr Stephen Price, Secretary, The Australian Workers' Union, *Transcript of Evidence*, 1 November 2013, p 7.

604 'Shell commits to \$25m Darwin supply base,' *ATN*, 7 March 2013. Available at: [http://www.fullyloaded.com.au/news/logistics/1303/shell-commits-to-\\$25m-darwin-supply-base](http://www.fullyloaded.com.au/news/logistics/1303/shell-commits-to-$25m-darwin-supply-base). Accessed on 4 March 2014.

605 Shell Development Australia, 'Design and construction contract—Shell Prelude FLNG project—Prelude onshore supply base—design & construct,' *ProjectConnect*, Awarded 25 March 2013. Available at: <https://www.projectconnect.com.au/uploads/616584851725.pdf>. Accessed on 4 March 2014.

606 *ibid*.

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- 6.82 The Committee notes that James Price Point is similar to the King Bay support facility in its proximity to a major population centre and associated infrastructure.

Finding 35

James Price Point provides an opportunity for a supply base, emergency response facility, helicopter support facilities, and fabrication and maintenance support. Such a facility would increase the offshore operations efficiency of projects in Commonwealth waters and, ultimately, increase revenue flow back to the federal government.

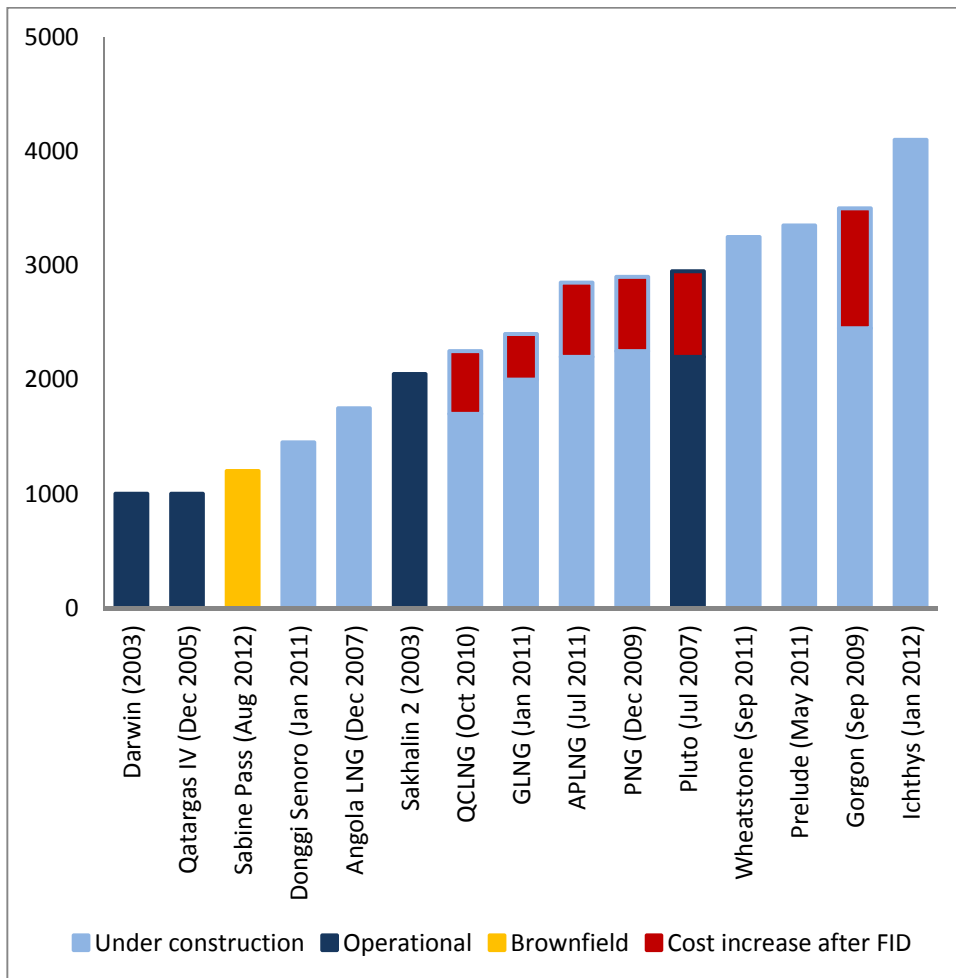
- 6.83 The Committee supports the development of James Price Point as a regional supply base for offshore operations in the Browse Basin, Bonaparte Basin and Timor Sea.

Recommendation 15

The Western Australian Government establish James Price Point as the site for a regional supply base and approach the Commonwealth Government for infrastructure funding.

The construction conundrum

- 6.84 Included within submissions made by APPEA, the Chamber of Minerals and Energy of Western Australia (Inc) (CMEWA), Shell and Woodside was an excerpt from a chart produced by the International Energy Agency's *Gas medium-term market report 2013*, which features the construction costs (in US\$ per tonne of LNG capacity) of various recent LNG projects. That chart, which is reproduced below, positions the recent Australian LNG projects—and in particular, those projects that will develop natural gas from conventional fields off the Western Australian coastline—as being the most expensive LNG projects ever undertaken.

Figure 6.5: Construction cost of recent LNG projects (US\$ per tonne of LNG capacity)⁶⁰⁷

6.85 While the chart is somewhat misleading in that it omits cost increases owing to inflation, it nonetheless demonstrates the proponents of recent Australian LNG projects are facing unparalleled cost pressures. Particularly as the global LNG market enters into a period of uncertainty, high construction costs represent a threat to any proposed, but as yet unsanctioned, LNG project. On this point it is worth noting that, at Woodside's forecasted construction cost of \$80 billion, LNG from an onshore Browse project would cost about US\$6000 per tonne of capacity—approximately 50 per cent more than INPEX's Ichthys project.

6.86 Again the Committee notes that this Inquiry has been dependant on company provided data which have not been independently audited by any federal or state government

607 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 9. Chart amended with the addition of date of positive FID for each project.

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agency.⁶⁰⁸ The Committee also notes that these figures are capital expenditure estimates and do not include the operating costs, which are higher for FLNG projects.

6.87 Added into this equation is the fact that onshore construction project budgets are often exceeded. In the case of the Gorgon project, the current forecast of \$54 billion is some \$17 billion—or 50 per cent—in excess of the project budget when it was approved for development in 2009.

6.88 That project budgets can run so significantly higher than originally planned owes to a range of factors, not the least of which is the fact that these projects are effectively unparalleled in scope. Furthermore, while it must be recognised that it is a rare occurrence for any megaproject to meet its projected budget,⁶⁰⁹ the fact that Australian LNG projects are built in some of the most remote and inhospitable environments on earth complicates the task of accurately projecting requisite capital expenditure.

6.89 Cost blowouts on Australian LNG projects are often simplistically claimed to be the result of wage demands and low productivity of Australian workers. While it is true that Australian workers receive what are, in a global context, good wages for their work on these projects, the cost overrun on the Gorgon project, for example, cannot simply be attributed to high wages for individual Australian workers. This was made clear by Mr Price of the AWU, who explained to the Committee that:

*these major projects are constructed in Western Australia with set wage rates for the project. There are no surprises or unexpected increases in wages during the projects. Gorgon is a classic example. We set the agreement for the project at the beginning, two years ago... What that does is it gives the project certainty about labour costs. If they stick to their predicted labour requirements then they know exactly how much it is going to cost.*⁶¹⁰

6.90 Again, the Committee appreciates that the Gorgon Project is unique and, therefore, it is difficult to make direct comparisons against this project.

608 The Committee notes that company data is examined by NOPTA and the Department of Mines and Petroleum when assessing commercial viability provisions.

609 Altshuler, Alan and Luberoff, David, *Mega-projects: the changing politics of urban public investment*, The Brookings Institute, Washington D.C., 2003, pp 243-245.

610 Mr Stephen Price, Secretary, The Australian Workers' Union, *Transcript of Evidence*, 1 November 2013, p 5. The issue of labour cost and productivity is discussed in detail in Volume 2.

6.91 However they might be caused, the potential for cost overruns is a significant risk inherent to any Australian LNG project. This was explained by Mr Robert Cole, Executive Director of Woodside, who explained that:

*with an onshore... LNG plant versus a floating, you avoid the cost of dredging [and other] massive civil works. My understanding is that civil works is an area where there can be a high degree of uncertainty as to how much work is required and where cost overruns can occur—port facilities, port infrastructure.*⁶¹¹

6.92 By contrast, the capital expenditure for an FLNG project at the time of final investment decision is expected to be more certain. For this reason, Mr Krzywosinski of Chevron stated that ‘it is clear that floating LNG, at least in my view, is an industry response to Australia’s high cost environment.’⁶¹²

6.93 With this in mind, another project development option likely to feature more heavily in Australia’s future involvement in the global LNG market will be brownfield investment. By 2020 WA will be home to four operating onshore LNG plants, with a combined capacity to produce more than 44 mtpa of LNG. Though these plants will be supplied by significant reserves of natural gas for some time, as these reserves are depleted it will likely become increasingly attractive to make use of existing infrastructure to develop new gas fields.

6.94 The attractiveness of brownfield investment was explained by Mr John Anderson, Vice-President for Western Australia and Northern Territory, Santos, who said that:

*I think one of the things that we are going to urge and push and try and find that door opening will be brownfields opportunities through existing facilities. Because one thing we do not have to have as a company is to have our ownership all at the door—to have another brand-new facility built with our nameplate on it. We are more than happy to put our gas molecules through somebody else’s facility. I would like to think that you will see more of that going forward, and I think that will be another response to the cost equation and another response as to how we can sell more LNG to Asia and still compete against some of these other countries.*⁶¹³

611 Mr Robert Cole, Executive Director, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 11.

612 Mr Roy Krzywosinski, Managing Director, Chevron Australia, *Transcript of Evidence*, 24 October 2013, p 4.

613 Mr John Anderson, Vice-President WA and NT, Santos, *Transcript of Evidence*, 21 October 2013, p 7.

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6.95 The Committee notes that the projected cost advantage enjoyed by American LNG plants—such as the Sabine Pass facility in Louisiana, which will theoretically be able to produce LNG for vastly less capital expense than any of the current Australian projects—owes as much to the benefit of brownfield investment as to the availability of cheap natural gas in the US. Furthermore, in addition to the strong business case for brownfield investment, it also represents a sensible step in environmental terms.⁶¹⁴

6.96 Indeed, the Director General of the DSD, Mr Stephen Wood, explained that part of the strategy of DSD was to try to encourage brownfield investment in the name of ‘efficiency of capital and site for the purposes of those processing facilities’ that operate to develop Australian natural gas in Western Australia. Explaining that DSD seeks ‘the cooperation of the [oil and gas] companies’ in Western Australia to try to facilitate the development of natural resources in a capital and environmentally-efficient manner, Mr Wood stated that this endeavour:

*is a large part of [our] work. Whether you are going to achieve it or not is another issue because of people’s own preference as to how they spend their capital and what parts of that they wish to control for the purposes of operational or whatever.*⁶¹⁵

6.97 While the construction of onshore LNG plant infrastructure has generated tens of thousands of employment opportunities and, as such, served as a significant form of economic stimulus in the past, it would be unrealistic to assume that greenfield project investment in LNG plant facilities will continue indefinitely. In a sense, the availability of commercially viable FLNG technology has begun to curtail this investment sooner than had been expected. As such, FLNG technology represents a challenge to the Australian construction industry. The manner in which this challenge is faced will determine the extent to which advantage of the opportunities presented by FLNG technology will be taken.

Finding 36

Historically, onshore gas processing plants have been a significant driver of economic growth in Western Australia.

Finding 37

The use of FLNG technology to develop gas fields in Australian waters will significantly reduce construction opportunities for Western Australian businesses and the related flow-on opportunities.

614 The Committee acknowledges that brownfield investment comes with its own complexities.

615 Mr Stephen Wood, Director General, Department of State Development, *Transcript of Evidence*, 19 February 2014, p 12.

Chapter 7

Opportunities arising from FLNG technology

A centre of excellence is not just going to hatch out of an egg.

Mr Stephen Grocott, Department of Commerce⁶¹⁶

- 7.1 Chapters 5, 6 and 7 have demonstrated the predominantly negative impact that FLNG technology in comparison with onshore projects will have on the engineering and design, fabrication and manufacturing, and construction and ancillary services sectors of the Western Australian economy. While there may be some subsea and process engineering, and some operational support opportunities, local content comprising concept and front end design and engineering, fabrication and manufacturing, and construction will substantially decline.
- 7.2 Oil and gas companies pointed to significant opportunities for Western Australian business, however, as the previous chapters demonstrate these are largely in the operational phase of FLNG projects.
- 7.3 Another opportunity frequently mentioned was the potential for Perth to become an FLNG centre of excellence or hub. Woodside, Santos, ConocoPhillips, INPEX, Shell and others advised that Western Australia (WA) has an opportunity to become a global centre of excellence or a hub for FLNG.⁶¹⁷
- 7.4 For example, INPEX states that 'Perth is ideally positioned to develop itself as the centre of excellence for FLNG.'⁶¹⁸ Similarly, the Chamber of Minerals and Energy of Western Australia (Inc) (CMEWA) stated that Western Australia 'is starting to get recognised as a knowledge and skills hub for LNG in the Asia-Pacific region as a consequence of the North West Shelf.'⁶¹⁹

616 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 10.

617 See, for example: Mr Shaun Gregory, Senior Vice President, Health, Safety, Environment and Technology, Woodside Petroleum, *Transcript of Evidence*, 16 October 2013, p 14; Mr John Anderson, Vice-President, WA and NT, Santos Ltd, *Transcript of Evidence*, 21 October 2013, p 5; Ms Kayleen Ewin, Vice-President, Sustainable Development, Communications and External Relations, ConocoPhillips Australia Pty Ltd, *Transcript of Evidence*, 21 October 2013, p 6; Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2; Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 2. See also evidence from APPEA, CMEWA, CCIWA and Chevron.

618 Submission No. 19 from INPEX Operations Australia Pty Ltd, 30 August 2013, p 8.

619 Ms Nicole Roocke, Representative, The Chamber of Minerals and Energy of Western Australia (Inc), *Transcript of Evidence*, 1 November 2013, p 5.

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- 7.5 Furthermore, as Prelude, Shell's first FLNG facility, will operate off the Western Australian coast, the opportunity for Perth to further develop its capacity in workforce training and development was also raised in evidence.⁶²⁰
- 7.6 This chapter explores each of these opportunities.
- 7.7 Given the significance of FLNG technology for WA, the Committee has decided to undertake further work on the possible opportunities that might be generated for local suppliers. This additional work will be presented in a separate report to Parliament.

What is a centre of excellence?

- 7.8 As the following demonstrates, the potential for WA to be a centre of excellence or hub for FLNG was a strong theme throughout the evidence. However, apart from including sponsorship university chairs, it was difficult to determine what companies meant by the terms 'centre of excellence' or 'hub.' Discussions during hearings did not make it much clearer to the Committee what this concept meant or what it might look like.
- 7.9 When asked how the promised development of Perth as a centre of excellence might be achieved, Mr Stephen Grocott of the Department of Commerce (DCom) stated that:

*we have heard terms like "oil and gas hub" and "centre of excellence" thrown around now for decades to the point where it really has become meaningless rhetoric. Having read the transcripts of this hearing, it is being offered as a palliative; as the substitute for the loss of the substantial benefits that would normally apply to an onshore operation not only in terms of the actual construction of onshore plant, but the construction of social infrastructure and the deals that were being negotiated with local community groups such as around James Price Point. Yes, the University of Western Australia might get a bit of funding to do research on extraction technology or an assessment of the surface of the seabed, but, no, we cannot put any specifics in place when it comes to terminology like that that.*⁶²¹

- 7.10 Therefore, based on the evidence presented, the Committee has reached the following view.

620 See, for example: Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 2; Mr Steven Phimister, General Manager, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 11; and Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, Challenger Institute of Technology, *Transcript of Evidence*, 15 November 2013, p 8.

621 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 9.

- 7.11 It seems that a centre of excellence is a collection of knowledge or skills or experience in particular areas of particular disciplines. While various existing or planned centres of excellence are outlined below, it also seems that once multiple centres of excellence are established in an area or network—whether they be within resource companies, academic institutions and/or industry—they begin to form a cluster that, once a critical mass is achieved, becomes a hub.
- 7.12 INPEX was, perhaps, the clearest in explaining what it meant by the term ‘an LNG centre of excellence.’ For INPEX, describing Perth as a centre of excellence means ‘there is a critical mass of activity here in lots of spaces focused on developing LNG’ and that this involves research and development, innovation centres and a ‘critical mass of people.’⁶²² Furthermore, a centre of excellence means not only the oil and gas companies, but encompasses the service providers, contractors and consultants with LNG expertise.⁶²³

Finding 38

There is no commonly agreed definition of what constitutes a centre of excellence.

Western Australia was/is/could be a centre of excellence

- 7.13 As noted in Chapter 5, train 4 of the North West Shelf project was designed and engineered out of Perth. At that time Perth was poised to become a centre of excellence for LNG design and engineering, but because the work for train 5 was done in Reading, ‘the fourth Train team was disbanded after completion.’⁶²⁴ Consequently, the opportunity at that time was lost.
- 7.14 However, not all the evidence presented agreed with this position. Mr John Anderson from Santos argued that Perth was ‘still a centre for LNG excellence today.’⁶²⁵ According to Mr Anderson:

at Santos, if I look at our operated project on Curtis Island, I know that a lot of the individuals that we will bring in to do peer reviews and participate in various workshops and other governance aspects, will be people out of Perth because of that LNG experience that is now embedded in Western Australia. If we look at the FPSO experience that

622 Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 9.

623 *ibid*, p 9.

624 Nahan, Dr Mike, MLA, Economics and Industry Standing Committee, ‘Chair’s foreword,’ *The potential for the development of a centre of excellence in LNG industry design in Western Australia. A discussion paper*, Parliament of Western Australia, Perth, 2010, p xi.

625 Mr John Anderson, Vice-President, WA and NT, Santos Ltd, *Transcript of Evidence*, 21 October 2013, p 5.

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*has been generated in Western Australia, a lot of that expertise is here.*⁶²⁶

- 7.15 Similarly, Mr Townsend of INPEX argued that ‘Perth is poised to leverage floating LNG to maintain its position as a global LNG centre of excellence,’ suggesting that:

*Perth is actually already an LNG centre of excellence... Perth is already globally renowned as being an LNG centre of excellence. By that we mean that there is a critical mass of activity here in lots of spaces focused on developing LNG.*⁶²⁷

- 7.16 It is difficult to reconcile statements that Perth is already a centre of excellence with others about the potential for Western Australia to become a centre of excellence, particularly when it was submitted that ‘floating LNG is just LNG that just happens to be packaged a little bit differently.’⁶²⁸

- 7.17 Some of the difficulty arises from the fact that different witnesses see potential for different centres of excellence. For example, Perth apparently has the potential to be a centre of excellence in FLNG:

- design and engineering;
- engineering and procurement research;
- support;
- research and innovation;
- skills and knowledge;
- technology and technical support;
- engineering training and education; and/or
- innovative science and engineering.

- 7.18 Notwithstanding the difficulties in defining the term, the following are examples of centres of excellence—existing and proposed—that were drawn to the Committee’s attention.

Western Australian Energy Research Alliance

- 7.19 The Western Australian Energy Research Alliance (WA:ERA) is an unincorporated joint venture between CSIRO, Curtin University and the University of Western Australia. It was established in September 2003 and has worked to build its capability in oil and gas education, research and development.⁶²⁹

626 *ibid.*

627 Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2 and p 9.

628 *ibid.*, p 9.

629 Submission No. 4 from Western Australian Energy Research Alliance, 27 August 2013, p 1.

- 7.20 Woodside and Chevron are partners in the joint venture and have funded the establishment and ongoing tenure of professorial chairs at the joint venture universities. Shell has also funded a university chair.⁶³⁰
- 7.21 WA: ERA is also the operator of the National Geosequestration Laboratory which was funded by a \$48.4 million federal government grant in 2012. According to WA: ERA, the laboratory's 'first priority' for research will be the South West Hub Carbon Capture and Storage Flagship project, which was announced in June 2011.⁶³¹

Australian Marine Complex

- 7.22 The Australian Marine Complex (AMC) was first proposed in the late 1990s as the 'Jervoise Bay Project' as the result of two major Senate reports: the 1989 *A sea of lost opportunities?*; and the 1998 *Sea of indifference*.⁶³² It also followed the implementation of then federal Defence Minister Hon Kim Beazely's 'two oceans policy,' and the expansion of HMAS Stirling at Garden Island as a major fleet base. The Jervoise Bay Project was opened in 2003 as the Australian Marine Complex–Common User Facility (AMC–CUF).⁶³³
- 7.23 The AMC was created to 'assist Western Australian and Australian companies to actively participate in major projects.'⁶³⁴ The AMC provides 'fit-for-purpose infrastructure' and assists Australian companies to participate in major projects 'by providing capability on a project cost basis, rather than in terms of their capex.'⁶³⁵ The State-developed 'common-use ethos' of the AMC 'was the first of its kind in the world.'⁶³⁶ The AMC was specifically designed to provide capacity and capability for fabrication, construction and load out of modular equipment for the oil, gas and mining sectors.

630 *ibid.*

630 *ibid.*

631 *ibid* p 2.

631 *ibid*, p 1.

632 Standing Committee on Industry Science and Technology, *The North West Shelf. A sea of lost opportunities?* Parliament of the Commonwealth of Australia, Canberra, November 1989; and Standing Committee on Industry, Science and Resources, *A sea of indifference—Australian industry participation in the North West Shelf project*, Parliament of Australia, Canberra, 30 March 1998.

633 Public Accounts Committee, *Inquiry into project planning and funding applications for major Western Australian Infrastructure projects*, Parliament of Western Australia, Perth, 2010, p 15.

634 Mr John O'Hare, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 8.

635 *ibid*; Submission No. 23 from Department of Commerce, 4 September 2012, p 4.

636 Mr John O'Hare, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 8.

Finding 39

The Australia Marine Complex provides capacity and capability to enable the fabrication, construction and load out of modular equipment for the oil, gas and mining sectors. It is also a hub for the subsea sector and associated companies, and the defence industry.

Figure 7.1: The Australia Marine Complex, Henderson.⁶³⁷



- 7.24 The Department of Mines and Petroleum (DMP) describes the AMC as ‘a world class centre for excellence for manufacturing, fabrication, assembly, maintenance and technology servicing the marine, defence, oil and gas and resource industries.’⁶³⁸
- 7.25 During the Committee’s site visit to the AMC, members were informed that the critical reason for the development of the AMC was that a lack of required infrastructure was impeding industry commitment to major projects in WA. The growth of the support service industry around the AMC is representative of the private sector’s investment in, and support of, the government’s vision for the project. At the time of the Committee’s visit there were around 150 companies operating around the AMC as a result of the facility’s development. Mr O’Hare cited the shipbuilding precinct as a particular example, with the AMC being home to several of Australia’s largest shipbuilding companies.

637 Image supplied by Ms Pru Ayling, Manager, AMC and PFSCUF Project, Department of Commerce.

638 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 11.

- 7.26 At a hearing, Mr O'Hare also discussed Civmec as a 'very good example of the private sector putting its money into fabrication and services' as companies start to focus on through-life support and maintenance opportunities.⁶³⁹
- 7.27 The technology precinct within the AMC is a research and development, and training hub, and is the home base of Raytheon Australia, the Australian Centre for Energy and Process Training (ACEPT) and Chevron's \$35m service and supply base.⁶⁴⁰
- 7.28 DCom submits that 'since 2003, the AMC has created A\$1.6 billion in economic activity, 24,000 jobs and 360 projects that would not otherwise [have] been undertaken in the State if the Government had not built the AMC.'⁶⁴¹
- 7.29 DCom also submits that the floating dock at the AMC could be extended to incorporate Stage 2, which involves an additional 16,000 tonne lift, to maintain the complex's 'unique capability of fit-for-purpose infrastructure' for new markets.⁶⁴² According to Mr O'Hare, Stage 2 would primarily support 'oil and gas-type vessels' and remove the barrier to undertaking further work at AMC.⁶⁴³

National Floating Systems Research Centre

- 7.30 In August 2013, then Prime Minister, Hon Kevin Rudd, MP, announced \$30 million in funding for a National Floating Systems Research Centre (NFSRC) over three years. The \$30 million will be matched by project partners, which include industry, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Institute of Marine Science (AIMS), Curtin University and the University of Western Australia (UWA).⁶⁴⁴
- 7.31 The NFSRC will be led by the CSIRO and AIMS, and is intended to capitalise on what is described as Western Australia's 'first mover advantage' in FLNG by building on and adapting existing skills and capabilities.⁶⁴⁵ The Australian Petroleum Production and

639 Mr John O'Hare, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 8.

640 Mr John O'Hare, General Manager, (Marine and Defence, Oil and Gas, AMC), Department of Commerce, Site visit conversation, 5 August 2013.

641 Submission No. 23 from Department of Commerce, 4 September 2012, p 4.

642 *ibid*, p 8.

643 Mr John O'Hare, Marine and Defence, Oil and Gas, Australian Marine Complex, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 8 and p 9. Under an agreement with the Commonwealth, Dock 1 has to be ready for submarine emergency docking, which limits the use of the dock for commercial purposes.

644 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 19; Submission No. 10 from Chamber of Commerce and Industry of Western Australia (Inc), 30 August 2013, p 10; Submission No. 7 from The Energy and Minerals Institute, University of Western Australia, 29 August 2013, p 7.

645 Submission No. 10 from The Chamber of Commerce and Industry of Western Australia (Inc), 30 August 2013, p 10; Submission No. 4 from Western Australian Energy Research Alliance, 27 August 2013, p 2.

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Exploration Association (APPEA) expects the NFSRC to be ‘a world leading research centre in offshore oil and gas production and floating systems aiming to attract new investment and new high-skill, high wage jobs to Australia.’⁶⁴⁶

7.32 However, as the funding was an election commitment of the former Labor Government, the current status of the funding for the NFSRC is unclear.⁶⁴⁷

Oil and Gas Industry Innovation Partnership

7.33 The establishment of the Oil and Gas Industry Innovation Partnership (OGIIP) was a commitment made by the former federal Labor Government in August 2013 under its Industry Innovation Precincts initiative.⁶⁴⁸ The proposal for the OGIIP was led by Woodside, with other proponents including major explorers and producers such as Shell, Chevron and General Electric, suppliers, researchers and educators.⁶⁴⁹ It was expected to ‘receive \$16 million to establish the partnership, with a further \$4 million per annum for ongoing operations.’⁶⁵⁰

7.34 Woodside advised that the OGIIP ‘will be headquartered in Perth with several interstate node offices, and governed by a six member board, equally represented by industry, subject matter experts and universities.’⁶⁵¹ DCom sees the OGIIP as:

*establishing and fostering collaboration between industry and the research sector in Australia to improve productivity, create new growth models and exploit economic opportunities emerging from growing international demand, especially Asia; targeting innovation in on-shore and off-shore technologies for construction, exploration, operations and sustainable business practice.*⁶⁵²

7.35 Woodside advised that the OGIIP would initially focus on improving construction productivity; gas developments; computational geosciences; subsea production technologies; remote plant operation; cooperative business and safety practices; and the social impact of oil and gas.⁶⁵³

646 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 19.

647 Submission No. 40 from The Chamber of Minerals and Energy of Western Australia (Inc), 27 November 2013, p 4.

648 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 22.

649 Submission No. 23 from Department of Commerce, 4 September 2013, p 7.

650 Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 20.

651 *ibid.*

652 Submission No. 23 from Department of Commerce, 4 September 2013, p 7.

653 Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 21. See also: Submission No. 7 from The Energy and Minerals Institute, University of Western Australia, 29 August 2013, p 7; Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 22; Submission No. 12 from Australian Petroleum Production and Exploration

7.36 The current status of the funding application is not known. The CMEWA ‘understands this initiative remains subject to the consideration of the new government.’⁶⁵⁴ The Department of Industry is currently reviewing its Innovation Precinct Program, and while no decision has been made by the government in relation to this program, at this time the future of the OGIP is unclear. DCom, through informal discussions with the federal Department of Industry, understands that this project ‘is probably on the backburner now.’⁶⁵⁵

Finding 40

The future of the National Floating Systems Research Centre and the Oil and Gas Industry Innovation Partnership is uncertain due to a lack of clarity in relation to Commonwealth Government funding.

Recommendation 16

The Western Australian Government urge the Commonwealth Government to recommit to the previously promised funding for the National Floating Systems Research Centre and the Oil and Gas Industry Innovation Partnership.

Centre for Offshore Foundation Systems

7.37 Established in 1997, the Centre for Offshore Foundation Systems (COFS) comprises a number of departments of the University of Western Australia (UWA). COFS has 40 researchers, consulting engineers and technical staff whose work ‘provides pivotal support to both the local and global engineering communities.’⁶⁵⁶ UWA submitted that COFS, which is strategically aligned with Advanced Geomechanics, has developed ‘one of the most sophisticated research and modelling facilities in offshore geomechanics and engineering in the world.’⁶⁵⁷ UWA argues that this is a ‘good example of how first-movers are able to achieve maximum market share with a competitor.’⁶⁵⁸

Australian Centre for Energy and Process Training

7.38 ACEPT is located at the Challenger Institute of Technology in Munster, Perth. ACEPT’s world class closed loop training facility is the only one of its kind in the southern

Association Limited, 30 August 2013, p 19; and Submission No. 15, Shell in Australia, 30 August 2013, p 12.

654 Submission No. 40 from The Chamber of Minerals and Energy of Western Australia (Inc), 27 November 2013, p 5.

655 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 10.

656 Submission No. 7 from The Energy and Minerals Institute, University of Western Australia, 29 August 2013, p 5, p 9 and p 10.

657 *ibid.* Advanced Geomechanics is a specialist consultancy in geotechnical design solutions. See: <http://www.ag.com.au/>. Accessed on 6 February 2014.

658 Submission No. 7 from The Energy and Minerals Institute, University of Western Australia, 29 August 2013, p 5, p 9 and p 10.

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hemisphere and represents state and federal investment of \$21 million.⁶⁵⁹ ACEPT provides training for those wanting a career in the oil and gas, pharmaceutical, chemical and mining industries.⁶⁶⁰

7.39 According to APPEA, ACEPT is ‘the oil and gas industry’s recognised centre for excellence for entry level skills development and also ongoing up-skilling of the oil and gas industry workforce,’ including production operators, maintainers and associated trades such as electrical instrumentation.⁶⁶¹

7.40 ACEPT advised that it ‘works closely with the oil and gas sector and has strong support from industry partners, including Chevron Australia, BHP Billiton, Apache, Inpex, Shell and Woodside.’⁶⁶² Programs are provided for new entrants, existing workers and international students, with ties developed with ‘companies and organisations in the Middle East, Indonesia, Mongolia, East Timor, Papua New Guinea, Brunei, Chile and many other parts of the world.’⁶⁶³

7.41 Shell advised that to help build local capacity to support its Prelude project, it has financially supported the FLNG Training Consortium, a partnership between Challenger Institute and Curtin University. This partnership will create the first FLNG training facility at ACEPT and will train all Prelude operators.⁶⁶⁴

7.42 ACEPT is discussed further below in relation to opportunities for education, training and workforce development.

Global Centre for FLNG Learning and Research

7.43 The Global Centre for FLNG Learning and Research is a partnership between Curtin University and Shell Development Australia. The Centre will ‘provide professional leadership, management and technical education specifically relevant to the FLNG industry and will involve partnerships with Vocational Education and Training (VET) providers for training in liquefied natural gas (LNG) factory operations.’⁶⁶⁵

659 Submission No. 2 from Challenger Institute of Technology, 15 August 2013, p 1; and Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 19.

660 Submission No. 2 from Challenger Institute of Technology, 15 August 2013, p 1.

661 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 19.

662 Submission No. 2 from Challenger Institute of Technology, 15 August 2013, p 1.

663 *ibid.*

664 Submission No. 15, Shell in Australia, 30 August 2013, p 12.

665 *Curtin and Shell partner to establish global learning and research centre*, Media Statement, Curtin University, Perth, 20 May 2011. Available at: <http://news.curtin.edu.au/media-releases/curtin-and-shell-partner-to-establish-global-learning-and-research-centre/>. Accessed on 6 February 2014. See also: Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, pp 19–20.

7.44 The Centre will also develop FLNG-focused PhD research, with Shell having input into the selection of PhD candidates and research topic selection, and access to the research outcomes.⁶⁶⁶

Benefits of centres of excellence

7.45 As the following demonstrates, evidence in relation to the benefits of centres of excellence was largely presented to the Committee in general, descriptive terms. Most of this centred around capacity building, developing innovative solutions, research and exporting skills and knowledge.

7.46 The CMEWA stated that:

*Western Australia's substantial gas reserves do position us to be at the forefront of innovation for the LNG sector, with significant opportunities for the development of LNG centres of excellence. We see there is opportunity for research and development to have flow-on effects to other sectors, such as the state's education sector, ICT and the other support industries.*⁶⁶⁷

7.47 INPEX referred to excellent opportunities, not just for:

*academic research but the ability to attract and retain professional expertise, build capacity through access to sophisticated engineering and develop new supply-chain networks. Eventually this may lead to the opportunity to export technology, people and services and not simply develop the resources themselves.*⁶⁶⁸

7.48 Shell, too, saw export opportunities, stating that the company was:

*committed to working with state and federal governments, other industry players and major institutions in the further development of Perth as an LNG hub, establishing a competitive edge so that WA can develop skills and knowledge that may also be exported to the international oil and gas business.*⁶⁶⁹

7.49 The WA: ERA was the only Inquiry participant to quantify the potential benefits of a centre of excellence. According to a 2010 study, 'a conservative risk-adjusted present value impact for Western Australian industry' for a subset of the joint venture's

666 Submission No. 12 from Australian Petroleum Production and Exploration Association Limited, 30 August 2013, p 20.

667 Ms Nicole Roocke, Director, The Chamber of Minerals and Energy of Western Australia (Inc), *Transcript of Briefing*, 26 June 2013, pp 6–7.

668 Mr William Townsend, General Manager, External Affairs and JV, INPEX, *Transcript of Evidence*, 23 October 2013, p 2.

669 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 3.

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research was \$354 million to \$623 million over the next 25 years.⁶⁷⁰ This value will be generated by 'reducing the capital intensity of LNG infrastructure, production efficiencies and unlocking new gas reserves.'⁶⁷¹

Creating critical mass

7.50 A further benefit attributed to centres of excellence is their capacity to attract other business to develop in the area. CMEWA stated that 'having people in the state... creates the opportunity for secondary businesses and consultancies to be created to support the market internationally.'⁶⁷²

7.51 The WA: ERA argues that its existence 'was a major factor in Chevron's 2007 decision to establish a Global Technology Centre in Perth.'⁶⁷³ Chevron advised that its Global Technology Centre (GTC) was one of two such facilities the company had in the world, the other GTC being in Aberdeen, Scotland. Chevron selected Perth for its second GTC 'due to its source of talented regional technology experts, proximity to our interest here in the region, and the opportunity to pursue research and development alliances with local universities.'⁶⁷⁴

670 Submission No. 4 from Western Australian Energy Research Alliance, 27 August 2013, p 1. WA ERA's report was also referred to by The University of Western Australia in Submission No. 7.

671 Submission No. 4 from Western Australian Energy Research Alliance, 27 August 2013, p 1.

672 Ms Nicole Roocke, Director, The Chamber of Minerals and Energy of Western Australia (Inc), Transcript of Briefing, 26 June 2013, p 8.

673 Submission No. 4 from Western Australian Energy Research Alliance, 27 August 2013, p 1.

674 Mr Roy Krzywosinski, Managing Director, Chevron, *Transcript of Evidence*, 24 October 2013, pp 3–4.

Chevron's Global Technology Centre⁶⁷⁵

Our [Chevron's] GTC currently employs around 130 professionals, including researchers, scientists, engineers and technical experts. This is to stimulate research and development in WA. ...The GTC develops technology capability in Australia, as well as our Asia-Pacific region, and provides a hub of technical excellence which is close here, obviously, to our WA-based assets. So this centre provides technical support for all of South-East Asia, including Perth. The GTC provides research and development solutions and integrated technical services in the areas of process safety, environmental stewardship, LNG processing, subsea engineering, exploration, reservoir management, enhanced hydrocarbon recovery and deepwater operations. The GTC also develops alliances with local universities and industry research partners to enable innovation and new technology deployments.

7.52 ConocoPhillips provided a further example of a company establishing a support centre in Perth to support fields in other jurisdictions. According to ConocoPhillips, it has established an integrated operating support centre in Perth to provide integrated planning, engineering and reservoir engineering for the Bayu-Undan and Darwin fields.⁶⁷⁶

ConocoPhillips' Integrated Operating Support Centre

We [ConocoPhillips] have integrated planning, engineering and reservoir engineering all located centrally in West Perth and in communication with the fields online. We are able to get instant data from the fields and the operators in the fields. We have a core team that sit in a room—in fact, a single room—who give that technical guidance to our operators. We can go the next step further and actually take control of operations off site, but we have not done that at this stage. That also gives this core team access to the support services they need, in terms of consultants, engineering, houses et cetera. That is a current-day example. Perth has a very good depth of engineering and other support services. As they become familiar with the floating technology—perhaps some of the first in the world to do so—we believe there is a real opportunity to be a support centre and export some of those skill sets that are built up. We feel we are already doing it for our Bayu-Undan and Darwin fields.

⁶⁷⁵ *ibid.*

⁶⁷⁶ Ms Kayleen Ewin, Vice-President, Sustainable Development, Communications and External Relations, ConocoPhillips Australia Pty Ltd, *Transcript of Evidence*, 21 October 2013, p 6.

Will multiple centres of excellence in Perth turn Western Australia into an LNG hub?

7.53 Norway and the United Kingdom were cited as examples of where clusters had developed and been leveraged to create LNG hubs. For example, the CMEWA sees centres such as the proposed OGIIIP as ‘a collaborative network to research ways of improving the industry and will replicate similar innovation networks operating in Norway and the United Kingdom.’⁶⁷⁷

7.54 Similarly, in speaking of the potential benefits of the NFSRC, APPEA suggests that:

*there is a significant opportunity for the state to harness the expertise that CSIRO has already put in Perth and the potential funding of the commonwealth to build on these clusters and expertise and capabilities that we already have. If we do that, that will be the best chance we have of emulating some of the outcomes we see in places like Norway and Aberdeen.*⁶⁷⁸

7.55 For CMEWA, FLNG centres of excellence ‘have been used to stimulate and coordinate petroleum research, development and production in places such as Norway and the United Kingdom.’⁶⁷⁹

7.56 Shell pointed to Norway as a country that had developed ‘world class technical expertise that is in high demand in the global oil and gas industry.’⁶⁸⁰ Shell advised that the total annual revenue of Norway’s offshore oilfield services industry is \$61 billion or more than 10 per cent of Norway’s GDP. It also employs approximately 100,000 people. Given that Norway’s first major hydrocarbon field was discovered in 1969, the fact that over one third of all floating production, storage and offloading (FPSO) vessels installed in the world are owned by Norwegian companies is a significant achievement.⁶⁸¹

677 Ms Nicole Roocke, Director, The Chamber of Minerals and Energy of Western Australia (Inc), *Transcript of Briefing*, 26 June 2013, p 6.

678 Mr Stedman Ellis, Chief Operating Officer Western Region, Australian Petroleum Production and Exploration Association Limited, *Transcript of Evidence*, 1 November 2013, p 8.

679 Submission No. 11 from The Chamber of Minerals and Energy of Western Australia (Inc), 30 August 2013, p 22. See also: Submission No. 26 from Professionals Australia, Australia, 12 June 2013, p 40.

680 Submission No. 15 from Shell in Australia, 30 August 2013, p 12.

681 *ibid.*

7.57 The following case study was provided by Woodside.⁶⁸²

Case Study: National Centre of Excellence Subsea (NCE) Norway

Innovation Norway set up NCE in 2006 to build capability in subsea maintenance, modification and operation. It was established in Bergen, the home of a cluster of subsea companies. By 2008 it had 100 members from business, education and research organizations. NCE Subsea builds the sector's presence in international markets, promotes R&D projects, facilitates education and training, and encourages cooperation. It is funded by Innovation Norway, Research Council of Norway and the Industrial Development Corp. of Norway (Siva). Employment in member companies rose from 2,500 in 2004 to 4,600 in 2008 and aggregate turnover increased by 255% in the same period. NCE Subsea facilitated 50 joint industry projects (JIP) and raised \$80 million in its first two years of operation for JIP and R&D activities. Demand for research projects is mostly from the industry. As an example, ClampOn is developing a subsea corrosion/erosion monitor as a joint project with BP and Innovation Norway.

Terdre, N. (2008), Bergen – Norway's center of advanced subsea engineering, Offshore Magazine, Volume 70, Issue 8

7.58 There are a number of existing centres of excellence in Perth and at least two potential centres subject to confirmation of federal funding. With the exception of the AMC and ACEPT, these are primarily focused on research. Major oil and gas companies such as Woodside, Shell and INPEX have also established offices in Perth. Chevron has recently purchased a parcel of land in Perth's Elizabeth Quay development on which it plans to construct an office tower.⁶⁸³ As the ConocoPhillips and Chevron examples above demonstrate, resource companies are also seeing the advantage of establishing support centres in Perth.

7.59 It remains to be seen whether this level of activity is sufficient to create a critical mass that will, in turn, make Perth a hub for FLNG. Evidence to the Committee suggests that this will largely depend on the collaboration between industry, governments and academic institutions.

7.60 According to Shell, the success of other jurisdictions such as Norway and the United Kingdom 'has stemmed from a very deliberate collaboration between industry and government to maximise opportunities.'⁶⁸⁴

682 Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 21.

683 *Energy giant Chevron buys first piece of land in the Elizabeth Quay development for \$64 million*, Media Statement, ABC News, 8 November 2013. Chevron purchased the 6,795 square metre site for \$64 million.

684 Submission No. 15 from Shell in Australia, 30 August 2013, p 12.

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- 7.61 UWA pointed to research into ‘the symbiotic relationship between industry, academia and government that can drive a successful knowledge-based economy.’⁶⁸⁵ This research concludes that it is ‘the willingness of people in each sector to strategically collaborate, effectively cooperate and compete in key areas to create new markets that make knowledge hubs and economies prosper.’⁶⁸⁶
- 7.62 Professionals Australia (formerly the Association of Professional Engineers, Scientists and Managers, Australia—APESMA) argues that the state and federal governments ‘have a role to play in driving innovation and providing the economic conditions that allows businesses to function efficiently’ and should work together ‘to investigate how Perth can advance towards becoming a leading “smart hub” in our region with highly skilled, innovative engineers whose talents can drive a high-growth, high-wage economy.’⁶⁸⁷
- 7.63 In discussing the potential for an engineering centre of excellence in WA, Professionals Australia reiterated this at a hearing, stating that there would be land available at universities and that capital could be obtained from project proponents ‘because they have an acute interest in having highly specialised skills flowing through... if you have the higher skilled engineers, then your productivity will be better.’⁶⁸⁸
- 7.64 The CMEWA also sees the establishment of Perth as a knowledge hub needs to be a collaborative effort. For CMEWA, the responsibility does not solely rest with the state government:

*Industry certainly has a role to play in being able to establish those centres of excellence as well and lead to the establishment of a knowledge hub. Almost certainly, the federal government has a significant role to play as well... I think there is opportunity for industry and the state government to present an argument to jointly approach the federal government to try to shift some of those conversations [about federal government research funding] because there is a stark difference between what we get compared with what other jurisdictions get.*⁶⁸⁹

Finding 41

The establishment of Western Australia as a global Centre of Excellence for FLNG will require a greater contribution of Commonwealth research funding to achieve long term strategic development for Australia in the offshore petroleum industry.

685 Submission No. 7 from The University of Western Australia, 30 August 2013, p 6.

686 Submission No. 7 from The University of Western Australia, 30 August 2013, p 6.

687 Submission No. 26 from Professionals Australia, 12 June 2013, p 22.

688 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 3.

689 Ms Nicole Roocke, Representative, The Chamber of Minerals and Energy of Western Australia (Inc), *Transcript of Evidence*, 1 November 2013, p 6.

Recommendation 17

The Western Australian Government pursue a greater contribution of research funding from the Commonwealth, particularly as PRRT revenue from offshore Western Australia flows to the Commonwealth.

7.65 DCom advised that the proposed OGIIIP provided an example of a ‘shared vision’ between industry, universities, government and industry associations. However, DCom also cited the McKinsey and Company report findings on the lack of cooperation between project proponents.⁶⁹⁰ Mr Grocott related the Department’s experience of discussing future steel fabrication capacity with the iron ore industry and the discovery that companies ‘had not talked to each other.’⁶⁹¹

7.66 Similarly, when DCom talked with the oil and gas industry:

*about the future of engineering design, it was the first time that Chevron, Woodside and Shell had been in the same room with [Professionals Australia] and Engineers Australia. I do not know what a centre of excellence is until everybody that is involved in it gets together and agrees. As I say, the Woodside thing [OGIIIP] looked very promising. It is the most concrete example in 10 years of rhetoric, but it would need long-term commitment.*⁶⁹²

7.67 In discussing the way in which innovation technology has been harnessed to create a cluster or hub elsewhere, Mr Steven Phimister of Shell acknowledged that ‘it takes a long time. I think we have to acknowledge that. It can take many, many, many years to develop that.’⁶⁹³ Mr Phimister further argued that ‘we have a golden opportunity here to do something similar.’⁶⁹⁴

7.68 DCom also noted that McKinsey and Company suggested Australia look to countries such as the UK and Norway ‘where you have a shared vision between government, projects, labour and academia.’⁶⁹⁵ The issue of cooperation is discussed further in Volume 2.

7.69 The Australian Workers’ Union (AWU) noted that ‘everyone is talking about the opportunity for Western Australia to become the global centre of excellence in regard to FLNG in both operational maintenance and supply, but no-one is expanding on what

690 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 10.

691 *ibid.*

692 *ibid.*

693 Mr Steven Phimister, General Manager, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 6.

694 *ibid.*

695 Mr Stephen Grocott, General Manager, Industry Participation Branch, Department of Commerce, *Transcript of Evidence*, 19 February 2014, p 10.

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that means.⁶⁹⁶ In discussing the Browse project, Mr Stephen Price argued that WA has:

*an opportunity to at least try to salvage something through the establishment of a centre of excellence and a supply base in Broome at the moment. Once again, there are a lot of people talking but not much action is happening on that, and these things are time critical.*⁶⁹⁷

Workforce training and development opportunities

Scarcity of skilled, work-ready labour

7.70 According to the Reserve Bank of Australia, 'one of the defining characteristics of the business cycle is the change in the demand for labour: when output rises, labour demand also rises.'⁶⁹⁸ As Chapter 13 (Volume 2) demonstrates, due to the number of projects under construction at the one time, demand for labour in resources development outweighed supply and led to a scarcity in skilled labour.

7.71 The Chamber of Commerce and Industry of Western Australia (Inc) (CCIWA) submitted that 'large numbers of workers will be required on an ongoing basis and significant workforce challenges will continue for WA.'⁶⁹⁹ CCIWA pointed to a shortage of geologists, geophysicists and mining engineers, and 'critical shortages of Chemical, Gas, Petroleum and Power Generation Plant Operators from 2012, with the shortages growing significantly from 2017 onwards.'⁷⁰⁰ Plant operators in particular are believed to be long-term positions over the lifetime of projects.⁷⁰¹

7.72 Professionals Australia submitted that the problem of the lack of skills shortages was exacerbated by the fact that graduates, who understandably are generally inexperienced, require employer investment 'over their first few years in the profession before they are able to become independently productive to a company.'⁷⁰² According to Mr Locke of Professionals Australia, the current education system:

does not mean that you are getting work-ready graduates any more. This is particularly the case with engineering where the demand is really for highly skilled or experienced professional engineers. They do

696 Mr Stephen Price, Secretary, The Australian Workers' Union, *Transcript of Evidence*, 1 November 2013, p 7.

697 *ibid.*

698 Lester, Ashley, 'Labour demand and the economic cycle,' *Reserve Bank of Australia Bulletin*, February 1999, p 1.

699 Submission No. 10, The Chamber of Commerce and Industry of Western Australia (Inc), 30 August 2013, p 9.

700 *ibid.*

701 *ibid.*

702 Submission No. 26 from Professionals Australia, 12 June 2013, p 33.

*not come out of university because a lot of the work-based learning does not occur any more.*⁷⁰³

Loss of opportunity to develop and maintain Western Australia's skills base

7.73 Chapters 4, 5 and 6 detailed the impact that FLNG developments will have on the engineering and design, fabrication and manufacturing, and construction and ancillary services sectors of the economy. These sectors have, to date, offered opportunities for young people to train in these areas and subsequently build Australia's skills base.

7.74 This was most succinctly explained by Mr Steve McCartney, State Secretary, Australian Manufacturing Workers' Union (AMWU), in discussing the impact of local fabricators receiving 23,000 tonnes of work out of the 395,000 tonnes for the Gorgon Project. In giving an indication of what opportunities that might provide, Mr McCartney stated that 'it means around 18 months' to two years' work for 1,000 people and approximately 190 to 250 apprentices getting an opportunity off the back of that work.'⁷⁰⁴ Mr McCartney explained that it was not only important to 'keep Western Australians employed; it is absolutely vital to keep them employed so we can build the skills base for the future.'⁷⁰⁵ Furthermore, the loss of manufacturing local content meant the loss of opportunity to build the skills needed 'for the future and to look after the projects after they are developed.'⁷⁰⁶

7.75 The AWU also expressed concern in relation to lost training opportunities arising from FLNG projects. These centred on the fact that FLNG is 'new and untested technology.'⁷⁰⁷ This possibly means, first, that considerable personnel from countries involved in the design, fabrication and manufacture of the FLNG facility will be required and, second, that employment numbers may actually reduce over time 'as the vessel becomes more efficient and automated.'⁷⁰⁸ For the AWU, 'the lack of major onshore facility will significantly reduce—from an already low base—the capacity for young Australians to receive training and apprenticeships.'⁷⁰⁹

7.76 As previous chapters demonstrate, the implications for young Western Australians are serious. As the AWU states, 'allowing young people to miss out on valuable training opportunities and careers in trades' will necessarily 'create intergenerational inequity,' curtail our ability to service Australia's domestic economy 'with the appropriate level of

703 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 4.

704 Mr Steve McCartney, State Secretary, Australian Manufacturing Workers Union, *Transcript of Evidence*, 1 November 2013, p 3.

705 *ibid.*

706 *ibid.*, p 5 and p 7.

707 Submission No. 14 from The Australian Workers' Union, 30 August 2014, p 7.

708 *ibid.*

709 *ibid.*

Chapter 7

skilled workers’ and, consequently, increase ‘the already demonstrated over-reliance on temporary workers.’⁷¹⁰

Potential for FLNG workforce training and development

7.77 While the introduction of FLNG technology represents a major challenge to those sectors of WA’s economy traditionally involved in the LNG industry, the Committee heard a number of suggestions for workforce training and development to ensure opportunities for employment and for skills development. Key among these were the use of State Agreements, the registration of engineers and the concept of WA as an FLNG training centre of excellence.

State Agreement conditions

7.78 Professionals Australia suggested that one way to achieve a ‘long-lasting high-skilled workforce’ in the state would be for government to ensure that all major service contracts and State Agreements require ‘workforce skills development plans.’⁷¹¹ Professionals Australia also pointed to government training offers, such as the national workforce development funds, that are available to companies to assist in skills development.

7.79 In its February 2013 *Report to the Western Australian Government on local engineering issues and policy*, Professionals Australia made the following recommendations:

That all future State Agreement Acts and all major service contracts must contain a requirement for a workforce skills development plan which incorporates local actions that will be applicable to all subcontracting companies. These should have a focus on the development of high-wage, high-skills jobs for the State.

*The Western Australian Government should work with the Commonwealth to ensure that all available government funding and assistance is clearly communicated to companies when they begin developing a skills development and training plan to ensure that training costs are minimised and local companies remain competitive.*⁷¹²

7.80 The February 2013 report prepared by Professionals Australia has not yet received a response from the Western Australian Government.

7.81 The AMWU argued market forces were not sufficient to provide for skills development. According to the AMWU, when state contracts are entered into, ‘skills development for

710 *ibid*, p 8.

711 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 2.

712 Submission No. 26 from Professionals Australia, 12 June 2013, p 7.

blue-collar workers [should be made] part of the bottom line so that we do have apprenticeships, we do develop skills and we do ensure that we keep our manufacturing industry.⁷¹³

Finding 42

The Western Australian Government has yet to respond to The Association of Professional Engineers, Scientists and Managers, Australia's report titled, *Report to the Western Australian Government on local engineering issues and policy*.

Recommendation 18

As part of his response to this Economics and Industry Standing Committee report, the Minister for State Development include a government response to the report titled, *Report to the Western Australian Government on local engineering issues and policy*.

Registration of engineers

7.82 Professionals Australia views the registration of engineers as 'an important and very practical way to firewall engineering work in Western Australia.'⁷¹⁴ Pointing to the Queensland scheme as an example, Mr Locke explained that a registration scheme can be practical and low cost, while not adding another layer of regulation.⁷¹⁵

7.83 In relation to ensuring that work designed overseas met Australian design standards, Mr Locke agreed that 'no solution is perfect.'⁷¹⁶ Nevertheless, he again pointed to Queensland as an example:

*Bechtel engineers are now becoming registered for work they are performing offshore, but arriving in Queensland. Basically, all engineering work has to be signed off by a registered Queensland engineer. That is how it works. Of course, in practice, it is patchy but it would be a vast improvement on what you have got.*⁷¹⁷

7.84 In discussing the possibility that such a registration scheme could be close to mandating local content, Mr Locked explained that there are registration schemes currently operating around the world relating to occupational health and safety, competence and the like. In fact, 'there is traffic of engineers under registration schemes.'⁷¹⁸ For Mr Locke, the importance of registering engineers arises from the

713 Mr Steve McCartney, State Secretary, Australian Manufacturing Workers Union, *Transcript of Evidence*, 1 November 2013, p 7.

714 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 2.

715 *ibid*.

716 *ibid*, p 3.

717 *ibid*.

718 *ibid*, p 4.

Chapter 7

potential for ‘engineering catastrophe,’ such as the West Gate Bridge collapse and the roof collapse of the Lane Cove Tunnel.⁷¹⁹

7.85 The 2013 Professionals Australia report makes a series of recommendations in relation to the registration of engineers, including that ‘the Western Australian government set up a streamlined approval process for engineering design work that has been completed in Western Australia by Western Australian registered engineers.’⁷²⁰

Finding 43

Representative bodies such as Professionals Australia and Engineers Australia support the registration of engineers.

Recommendation 19

The Western Australian Government work with the relevant engineering representative bodies to investigate the merits of a registration system for engineers—similar to that operating in Queensland—and the amendments to the Australian and Western Australian standards required for such registration to be recognised.

Centre of excellence in workforce training and development

7.86 Proponents of centres of excellence as a means of innovation and skills development noted the education, research and applied capacity of such a centre. For CCIWA, ‘investment in the supply of skilled staff is the key mechanism to reduce pressures on the industry and assist in the development of innovative solutions.’⁷²¹ Additionally, CCIWA argues that ‘further collaboration between education, training and research institutes, and the business community could greatly improve our capacity to delivery skilled staff, and to develop businesses associated with FLNG technology.’⁷²² CCIWA points to centres of excellence such as ACEPT and the NFSRC as examples of investment and cooperation that would provide opportunities for Australians.

7.87 Similarly, Professionals Australia pointed to an engineering centre of excellence as ‘the key’ to encouraging innovation and the development of the required skills base to meet future demand.⁷²³ Importantly, it would also include ‘hands-on’ training to better ensure that graduates and others are job ready.

ACEPT as a workforce training and development centre of excellence

7.88 As noted above, ACEPT was one of the centres of excellence brought to the Committee’s attention. The Committee received a submission and oral evidence from

719 *ibid.*

720 *ibid.*, p 3; Submission No. 26 from Professionals Australia, Australia, 12 June 2013, p 8.

721 Submission No. 10, The Chamber of Commerce and Industry of Western Australia (Inc), 30 August 2013, p 10.

722 *ibid.*

723 Mr Erik Locke, Professionals Australia, *Transcript of Evidence*, 10 February 2014, p 3.

ACEPT, and also visited ACEPT's training facility in Munster, WA. This allowed the Committee to see first-hand the work done at the facility and to engage with trainees on-site. The following draws very heavily on ACEPT's evidence and the Committee's on-site experience and observations.

7.89 ACEPT, based at the Challenger Institute of Technology, was opened in 2008 as a result of \$21 million investment by state and federal governments. This investment resulted in a facility that is unique in the southern hemisphere in that its full-scale process plant 'allows students to experience a simulated industry environment.'⁷²⁴

7.90 ACEPT provides training for careers in the oil and gas, pharmaceutical, chemical and mining industries.⁷²⁵ The Centre has programmes for new entrants as well as workers already in the resources industry, from recent employees to associate professional level.⁷²⁶ ACEPT also attracts students from the Northern Territory and Queensland, and from around the world, with ACEPT forging 'ties with companies and organisations in the Middle East, Indonesia, Mongolia, East Timor, Papua new Guinea, Brunei, Chile and many other parts of the world.'⁷²⁷

7.91 As well as having special programmes to increase the number of women and indigenous people in the resources industry, ACEPT delivers a range of qualifications including:

- Certificate III in Process Plant Operations
- Certificate IV in Process Plant Technology
- Diploma of Process Plant Technology
- Advanced Diploma of Process Plant Technology

7.92 ACEPT's Certificate IV and diploma courses can be used for entry to university, with arrangements for advanced standing with Curtin and Murdoch Universities.⁷²⁸

7.93 Training at ACEPT is offered through live training on the process plant, simulation, online, correspondence and classroom-based learning, workplace-based training and Recognition of Prior Learning using workplace-based assessors.⁷²⁹

724 Submission No. 2 from Challenger Institute of Technology, 15 August 2014, p 2.

725 *ibid*, p 1.

726 *ibid*, p 2.

727 *ibid*; and Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, Challenger Institute of Technology, *Transcript of Evidence*, 15 November 2014, p 4.

728 ACEPT, Challenger Institute of Technology, June 2012, p 9. See also: Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, *Transcript of Evidence*, 15 November 2013, p 2 and p 14.

729 ACEPT, Challenger Institute of Technology, June 2012, p 2.

Chapter 7

7.94 Western Australian students are funded through regular TAFE government funding arrangements. Students outside of WA are placed on a fee-for-service or commercial arrangement.⁷³⁰

7.95 Mr Greg Guppy, Director of ACEPT, sees ACEPT's mandate as getting people:

*job ready to go into the bottom rung of the ladder to work their way through that... Our mandate is to make sure that whoever wants to enter the industry or be recalibrated... to go into the industry, we as a training provider need to give everyone an opportunity to get into that new world.*⁷³¹

7.96 Resource companies such as Shell, Woodside, Apache, BHP Nickel West et cetera have different processes. Once trainees enter such organisations they are taught how to operate in accordance with their individual requirements. Such companies 'have very sophisticated kit, and they will not share it with anyone.'⁷³² Therefore, ACEPT works to give their 'new graduates an insight without destroying the commercial-in-confidence environment we are in with, "This is what you need to know if you wish to go here or if you wish to go there".'⁷³³

7.97 Working on a fully operational closed loop process train allows ACEPT students to 'learn by doing' and to graduate with an understanding of the resources industry and what business expects from them.⁷³⁴ ACEPT students:

*actually see a pump working, they actually work on a heat exchange or whatever. What a wonderful environment for engineering students to carry out that learning by doing! It has been a bonus for us, for instance, in electrical. We are the only college now in the state... that is offering a true electrical instrumentation outcome under the metals and engineering package. They can go out and practise on kit, they can calibrate, they can lube tune et cetera.*⁷³⁵

7.98 In 2007, ACEPT started with 200 to 300 students. At the end of 2012, ACEPT had 829 graduates and expects to have approximately 1,000 in 2013.⁷³⁶ The Committee understands that Mr Guppy has advised his Board that ACEPT is currently at 87 per cent of capacity 'in regard to room utilisation.'⁷³⁷ While taxpayers are getting 'very good

730 Ms Melanie Sorensen, General Manager Training Services, Challenger Institute of Technology, *Transcript of Evidence*, 15 November 2013, p 10.

731 *ibid*, pp 6–7.

732 *ibid*, p 7.

733 *ibid*, p 7.

734 *ibid*, p 8 and p 14.

735 *ibid*, p 8.

736 *ibid*, p 2.

737 *ibid*, p 3.

duty cycle out of the kit and... out of the classrooms,' ACEPT needs to develop strategies on how to accommodate growing numbers of students.⁷³⁸ At one point in 2012, ACEPT had 14 places and received approximately 160 applications.⁷³⁹

7.99 An Industry Management Board, consisting of 15 members who meet four times each year, 'guides ACEPT in setting strategic priorities and comprises of representatives from leading resources companies.'⁷⁴⁰ Mr Guppy, who sits on the Board as executive officer, advised that the Board provides 'insight from all the companies on what their manning or personnel levels are going to be.'⁷⁴¹ That allows ACEPT to provide government with a profile on those entering the industry and 'more importantly, where we [ACEPT] need to shift our focus in anticipation of where the world is going.'⁷⁴² Mr Guppy argued that ACEPT 'would have far, far stronger insight on what the industry requires in the manning and personnel levels in the future than possibly some government agencies.'⁷⁴³

7.100 As well as receiving strategic advice from its Industry Management Board, ACEPT has developed relationships and partnerships with industry. ACEPT advised that it has 'strong support from industry partners, including Chevron Australia, BHP Billiton, Apache, Inpex, Shell and Woodside.'⁷⁴⁴

7.101 As private enterprise is not able to donate money to government institutions, this support takes the form of in-kind donations of equipment. For example, Chevron has recently donated a nitrogen unit valued at \$600,000 to ACEPT. Mr Guppy explained the process as follows:

In regard to kit, they [companies] do donate kit to us and it is kit of use... some of the kit we need to purchase is very expensive. If we went to government for it, through my CEO, it would be a priority, but it would be an expensive bit of kit. What we do is get a heads-up from the companies, and companies generously donate or lend us kit to make that happen... So, there is no money. The relationship... with Honeywell, for example, has no exchange of money in any shape or form, but they see it as an opportunity to train students on their distributor control systems—DCS. Honeywell works with us closely.

738 *ibid.*

739 *ibid.*, p 14.

740 Submission No. 2 from Challenger Institute of Technology, 15 August 2014, p 1; and Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, *Transcript of Evidence*, 15 November 2013, p 3.

741 Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, *Transcript of Evidence*, 15 November 2013, p 3.

742 *ibid.*, p 2.

743 *ibid.*, p 3.

744 Submission No. 2 from Challenger Institute of Technology, 15 August 2014, p 1.

*They service it for me and give me the latest equipment; and, more importantly, they can see an opportunity, if someone is going to be trained on Honeywell gear, there is a good chance when they go back into industry they will be a champion for Honeywell. There are many permutations that we work with.*⁷⁴⁵

ACEPT as an FLNG centre of excellence

- 7.102 As noted above, ACEPT is currently at capacity and, if it is to continue to meet demand will need to expand. ACEPT has a development plan for what it refers to as Phase 2 of ACEPT, which would help establish ACEPT firmly as a global FLNG centre of excellence. This would facilitate the hands-on training of people from all around the world, and particularly the South-East Asian region, in engineering, including electrical, electronic and mechanical engineering.
- 7.103 ACEPT's Strategic Plan 2012–2014 outlines its development strategies and related performance measures. Two of these measures relate to the strategy of providing training to meet resource industry workforce needs. First is to 'establish the Global Centre for FLNG Learning and Research in partnership with Curtin University and develop services customised for the FLNG sector.'⁷⁴⁶ Second is 'develop programs and services for the FLNG sector.'⁷⁴⁷
- 7.104 In 2013, Challenger TAFE submitted a funding proposal to Department of Training and Workforce Development for \$15 million to allow Phase 2 to proceed. In keeping with ACEPT's philosophy of forming partnerships and working with industry, it has also received \$4.9 million of in-kind offers from industry for Phase 2.⁷⁴⁸
- 7.105 Furthermore, recognising the need to be in the FLNG marketplace, and to complement LNG, ACEPT is working with Shell to provide training for Shell staff. This is the first time that Shell has not conducted its own in-house training in The Hague.⁷⁴⁹ ACEPT, through a fee-for-service arrangement, contextualises the generic Shell training, with the possibility of students achieving an Australian qualification. A further advantage is that ACEPT will need to offer special training in areas of 'underpinning knowledge' for FLNG, such as basic refrigeration. This is viewed as a 'knock-on effect' that will be 'very positive for future candidates coming through ACEPT.'⁷⁵⁰

745 Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, *Transcript of Evidence*, 15 November 2013, p 4.

746 Challenger Institute of Technology, Australian Centre for Energy and Process Training, ACEPT Strategic Plan 2012-2014, Perth, nd, p 3.

747 *ibid.*

748 ACEPT, Committee Site Visit, 28 February 2014.

749 Mr Greg Guppy, Director, Applied Engineering and Australian Centre for Energy Process Training, *Transcript of Evidence*, 15 November 2013, p 6.

750 *ibid.*

7.106 The Committee is impressed with the work being undertaken at ACEPT and with Challenger TAFE's strategy to increase its capacity and to take up the opportunity presented by the need for FLNG training. It is essential that ACEPT be appropriately funded to allow this work to proceed. The decision on the government funding is needed as a matter of urgency, particularly as there will be a time lag between funding approval and construction of the new facility. If such funding is not received soon, this excellent opportunity will be lost and may well be another victim to the sea of lost opportunities.

Finding 44

The Australian Centre for Energy and Process Training is well placed to take advantage of the opportunity for workforce training and development for FLNG technology.

Finding 45

Without the necessary government funding, the Australian Centre for Energy and Process Training will not be able to maximise its potential to become a world-recognised centre for FLNG training.

Recommendation 20

As a matter of priority, the state government should approve the Australian Centre for Energy and Process Training's funding application for \$14 million to allow it to proceed to Phase 2 of its development.

Chapter 8

The impact of FLNG on Western Australia's domestic gas supply

...with FLNG not one molecule of gas would land in WA...

Mr Matthew Brown, Executive Director, DomGas Alliance, 2013⁷⁵¹

Weighing the interests

- 8.1 Natural gas is an increasingly important component of the global energy mix. Since 2000, global demand for natural gas has increased by about 2.7 per cent each year.⁷⁵² Furthermore, the International Energy Agency forecasts that natural gas will provide almost one quarter of world energy by 2035, up from 22 per cent in 2010.⁷⁵³
- 8.2 Western Australia (WA) has for a long time been ahead of this trend, with natural gas having provided more than a third of the state's energy since 1985, and more than 40 per cent since 1993.⁷⁵⁴ In effect, WA's economy is—and has long been—fuelled by natural gas.
- 8.3 Since 1989 natural gas produced in WA has also been at the heart of Australia's LNG export industry. Furthermore, this state's adoption of natural gas as its primary fuel source served as the catalyst for Australia's first ever LNG export project. The commitment by the Western Australian Government to purchase natural gas produced by the North West Shelf plant in Karratha effectively provided the guarantee needed by the project's operator, Woodside Petroleum, to obtain finance for constructing the LNG plant. In turn, the safe and reliable operation of the North West Shelf's domestic gas plant has provided as much as one third of the state's total energy mix for almost thirty years.
- 8.4 Since the turn of the century the growing global demand for natural gas has resulted in a number of Australian LNG export projects. The Pluto, Gorgon, Wheatstone, Prelude and Ichthys projects, all of which are scheduled to begin producing LNG by 2020, will each draw upon the large natural gas resources that are located off the WA coastline. Though these projects are primarily focused upon producing LNG for export, each of

751 Mr Matthew Brown, Executive Director, DomGas Alliance, *Transcript of Evidence*, 15 November 2013, pp 2–3.

752 International Energy Agency, *World Energy Outlook 2012*, 2012, p 127.

753 *ibid*, p 53.

754 Bureau of Resources and Energy Economics, *2013 Australian energy statistics: energy consumption in Western Australia, by fuel*, July 2013.

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the Pluto, Gorgon and Wheatstone projects will also supply significant quantities of natural gas into the Western Australian domestic market. Permission for each of these projects was contingent upon a number of factors, not the least of which being a commitment to supply some of the gas produced into the domestic market. A formal policy making the sanctioning of proposed LNG projects contingent upon this commitment was adopted by the state government in 2006.

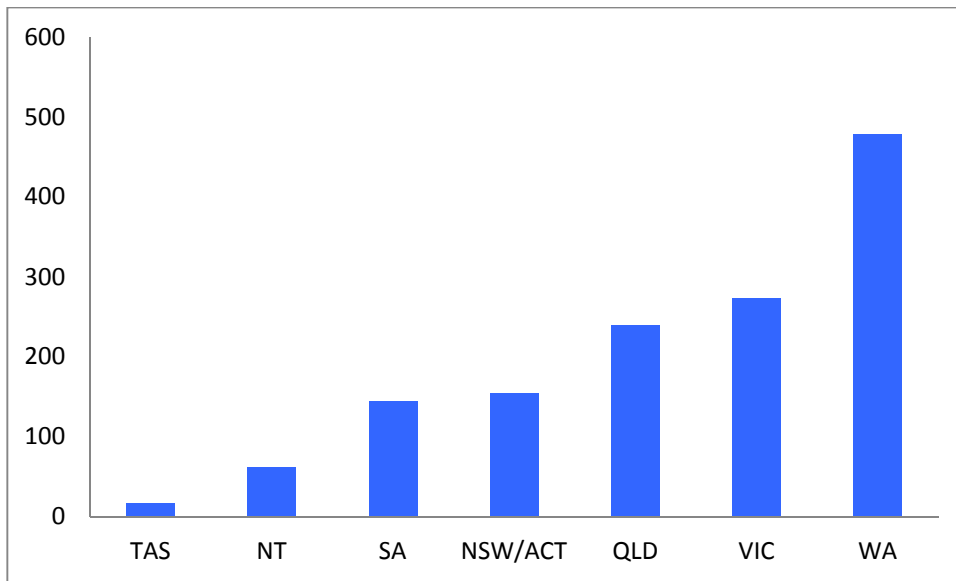
- 8.5 There is no such commitment associated with the Ichthys project, as the associated LNG plant is being constructed not in WA, but in the Northern Territory. As a consequence, none of the natural gas produced by the Ichthys project will be made available to customers in Australia.⁷⁵⁵ Instead, receipt of the federal Petroleum Resources Rent Tax (PRRT) will be the sole way in which Australians will be compensated for the sale of this resource.
- 8.6 The same is true for Shell's Prelude project, and indeed for any future project that is developed using FLNG technology. Unlike conventional onshore natural gas production and liquefaction, where FLNG technology is used the entire process of extracting, refining, liquefying and offloading natural gas for export occurs at sea. Furthermore, FLNG technology is only able to produce natural gas in LNG form. As a consequence, FLNG technology can only develop Australian natural gas resources for export. Where FLNG technology is used to produce an Australian natural gas field, none of that resource will be made available for domestic use.
- 8.7 FLNG technology therefore carries with it some significant implications for WA's domestic gas supply and for domestic gas users. To properly appreciate the full extent of these implications, it is useful to begin with a broad understanding of the role of natural gas in WA's economy, before turning to consider how the LNG export industry has traditionally existed in a symbiotic relationship with the production of natural gas for domestic consumption in this state. The established policy setting aimed at ensuring that the state is able to secure a commitment by LNG producers to also supply the domestic market with natural gas is then outlined, before examining how LNG functions as a technology, and as such why WA is not a market for LNG.
- 8.8 This chapter concludes with a consideration of how FLNG technology might impact upon WA by constricting the state's ability to rely upon a steady, safe and relatively cost-efficient source of locally-sourced and produced energy.

755 As mentioned previously, natural gas that, until it is produced, is at law the property of all Australians.

A vital resource

8.9 WA is by some distance the nation's largest consumer of natural gas. In 2011–2012 a total of 479 PJ of natural gas was consumed in aggregate across the state—meaning that Western Australian natural gas consumption accounted for about 35 per cent of all gas consumed in the country during that financial year.⁷⁵⁶ The importance of natural gas to the Western Australian economy is underscored by a brief comparison of the most recent measured quantity of gas consumed by each state, as shown in Figure 8.1 below.

Figure 8.1: Consumption of natural gas by state, 2011–2012 (PJ)⁷⁵⁷



8.10 The extent to which it serves as a primary fuel source further emphasises the extent of WA's reliance on natural gas. Across Australia in 2011–2012, natural gas accounted for around 23 per cent of total primary energy consumption.⁷⁵⁸ In the same period, natural gas met more than 47 per cent of WA's energy needs.⁷⁵⁹

8.11 Furthermore, natural gas has been WA's primary fuel source since 1991–1992, mainly because the overwhelming majority of Australia's conventional gas resources are located off the Western Australian coastline.⁷⁶⁰ At the beginning of 2011, Australia's

756 Bureau of Resources and Energy Economics, *Gas market report: October 2013*, Canberra, October 2013, p 27.

757 Source data obtained from the Bureau of Resources and Energy Economics, *2013 Australian energy statistics: energy consumption in Western Australia, by fuel*, July 2013.

758 Bureau of Resources and Energy Economics, *2013 Australian energy update*, Canberra, July 2013, p 6.

759 *ibid*, p 8.

760 Bureau of Resources and Energy Economics, *Gas market report: October 2013*, Canberra, October 2013, p 25.

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proved resources of conventional natural gas were estimated at 173,000 PJ (157 tcf).⁷⁶¹ Of this, about 160,000 PJ—almost 92 per cent—is located in the Carnarvon and Browse basins (off the state's north west coast) and in the Bonaparte Basin (off the north Kimberley coast).⁷⁶²

- 8.12 In a global context, these are significant natural gas resources. According to BP's most recent *Statistical review of world energy*, Australia possesses the eleventh greatest quantity of proved reserves of natural gas in the world.⁷⁶³ Owing to geographic factors, however, Australian households are not especially reliant upon natural gas for household heating. As a consequence households consume only a small proportion of the domestic natural gas that is produced.
- 8.13 Across Australia in 2011–2012, the manufacturing and mining sectors accounted for just over half of the nation's total consumption of natural gas, with electricity generation accounting for a further 32 per cent.⁷⁶⁴ Combined direct consumption by the residential and commercial sectors represented just 15 per cent of the total.⁷⁶⁵ That is, direct consumption of natural gas in Australia is heavily skewed towards industry. Figure 8.2 shows that this is even more pronounced in WA, where a relative abundance of domestic natural gas has come to be heavily relied upon by industry. In WA, industry accounts for more than 97 per cent of domestic natural gas consumption.⁷⁶⁶
- 8.14 About 27.5 per cent of all domestic gas consumption in WA is by Synergy, NewGen Kwinana and Alinta in generating electricity, with about 58 per cent of WA's electricity generation fuelled by natural gas.⁷⁶⁷ A significant proportion of this electricity is consumed by Western Australian households. As such, though the distinction between what is regarded as 'industrial' and 'non-industrial' natural gas consumption is based upon how that gas is directly used, it is clear that Western Australian households—as major indirect consumers of natural gas—also rely heavily upon this resource

761 Department of Resources Energy and Tourism; Geoscience Australia; Bureau of Resources and Energy Economics, *Australian gas resource assessment*, 2012, pp 1–2. Available at: http://www.ga.gov.au/webtemp/image_cache/GA21116.pdf. Accessed on 21 March 2014.

762 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Western Australia, 24 March 2011, p 1.

763 BP, *BP statistical review of world energy*, June 2013, p 20. Available at: http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf. Accessed on 17 March 2014.

764 Bureau of Resources and Energy Economics, *Gas market report: October 2013*, Canberra, October 2013, p 26.

765 Bureau of Resources and Energy Economics, *2013 Australian energy statistics: Western Australian energy consumption, by industry and fuel type*, July 2013.

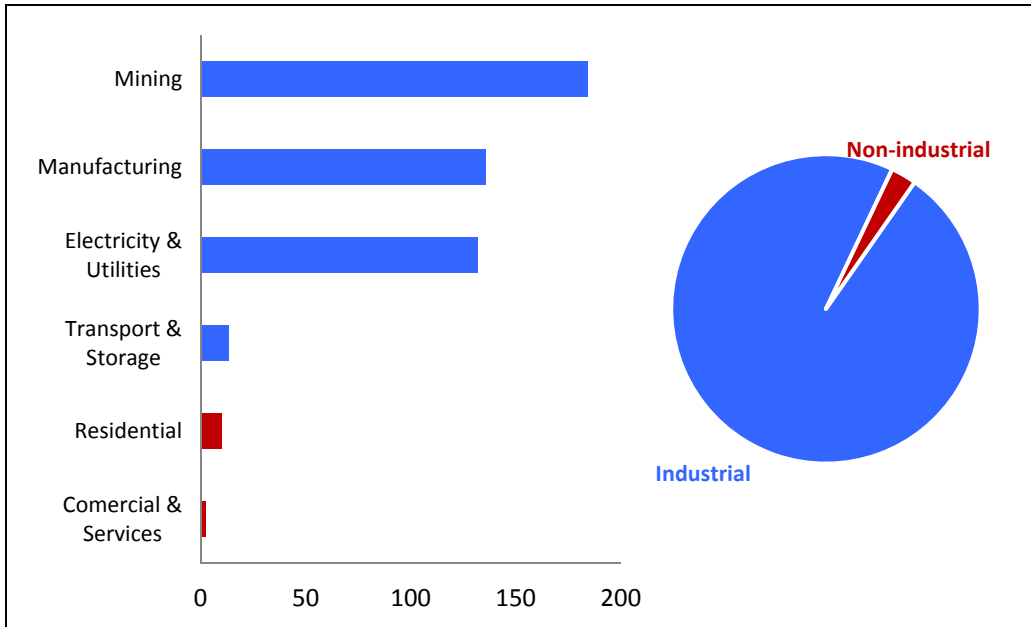
766 Bureau of Resources and Energy Economics, *Gas market report: October 2013*, Canberra, October 2013, p 28.

767 Bureau of Resources and Energy Economics, *2013 Australian energy statistics: Western Australian energy consumption, by industry and fuel type*; and *2013 Australian energy statistics: Electricity generation in Western Australia, by fuel type*, July 2013.

Finding 46

In Western Australia 97 per cent of natural gas is consumed by industry and in electricity generation, with direct residential and commercial consumption making up the remaining 3 per cent.

Figure 8.2: Natural gas consumption in Western Australia, proportional by sector 2011-2012 (PJ)⁷⁶⁸

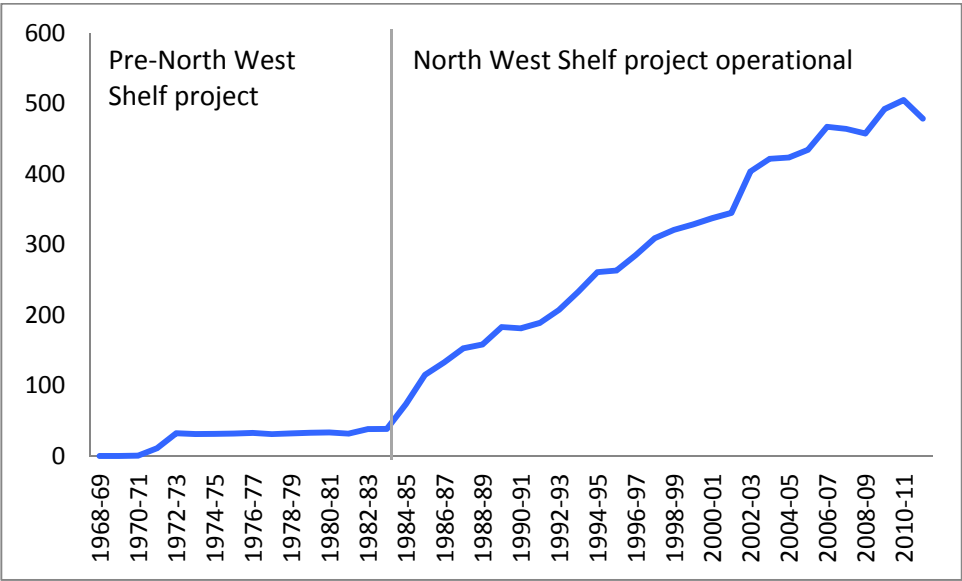


8.15

When all of these factors are drawn together, the importance of natural gas in WA becomes abundantly clear. Because WA is in closest proximity to the vast majority of Australia's conventional reserves of natural gas, more gas is produced and consumed in WA than in any other state. The history of natural gas consumption in WA demonstrates that, in the time since the North West Shelf gas plant first produced natural gas for the domestic market in 1984, the state's consumption of natural gas has grown steadily and substantially. This is illustrated by Figure 8.3.

⁷⁶⁸ Source data obtained from the Bureau of Resources and Energy Economics, *2013 Australian energy statistics: Western Australian energy consumption, by industry and fuel type*, July 2013.

Figure 8.3: Consumption of natural gas in Western Australia (PJ)⁷⁶⁹



8.16 Again, this natural gas is overwhelmingly consumed by industry. It is therefore quite clear that natural gas is a fundamental and vital element of the Western Australian economy, and that WA’s continued economic prosperity is directly linked with the development and use of Australia’s large reserves of natural gas. Indeed, the economic prosperity associated with a steady supply of natural gas to industry in WA is illustrated within a pair of charts at Appendix Thirteen, which show that while major resource projects were spread all around WA in 1978, in 2014 our major resource projects are far greater in number—and are generally all congregated around major gas pipelines.

8.17 As noted elsewhere in this report, although natural gas is a global commodity, there is no global ‘market price.’ In fact, the price of natural gas varies dramatically between countries, largely based upon the method of delivery and its relative scarcity. As there is an abundance of natural gas in fields that are located in close proximity to WA, the domestic price of natural gas, as determined by the cost of production and distribution, has historically made it quite an attractive fuel for local industry. As such, recent moves by petroleum companies operating in WA to link the domestic price of natural gas to the global price of diesel are concerning.

8.18 The Committee has heard evidence that, rather than pricing natural gas for the domestic market on the basis of the local cost of production, petroleum companies that produce natural gas in WA are now seeking the equivalent of what is paid by energy-poor customers in Japan, Korea and Taiwan for domestic sales of natural gas. While the Committee appreciates the rationale informing this pricing strategy, it must

769 Source data obtained from the Bureau of Resources and Energy Economics, *2013 Australian energy statistics: energy consumption in Western Australia, by fuel*, July 2013.

also be recognised that allowing petroleum companies to seek and obtain economic rent from domestic consumers threatens to severely undermine the global competitiveness of Western Australian industry.

- 8.19 This was made clear in a consultant's report provided to the Committee during a closed hearing. According to that report:

if sufficient reserves were developed to supply the domestic market and the conditions existed for new entry, we would expect domestic gas prices to reflect the cost of developing domestic reserves rather than the higher LNG netback price. We have estimated that the highest cost of domestic production is currently about \$7.18/GJ based on the Devils Creek project (all dollar values are expressed as real 2013-14 values unless otherwise specified).⁷⁷⁰

- 8.20 The report's conclusions were drawn from modelling the macroeconomic effect if domestic gas were priced to reflect the cost of supply:

Our modelling suggests that if the price of gas fell from an upper bound LNG netback price of \$10-\$12/GJ to \$7.18/GJ, then the Western Australian economy would benefit from an annual increase to Gross State Product of around \$2.5 billion in 2020, increasing to \$4.8 billion by 2030. This is a significant increase in Western Australia's GSP, which was around \$243 billion in 2012-13.⁷⁷¹

- 8.21 If domestic gas producers were more readily able to access Australian gas fields, the benefit to WA's economy would be even more profound:

As a sensitivity analysis we have modelled the impact on the Western Australian economy of the price of gas falling from LNG netback pricing to \$5.84—the highest cost of domestic gas production if the Devils Creek project can tap additional gas reserves. The benefits to the Western Australian economy would be more significant, with an annual increase to GSP of around \$2.8 billion in 2020, increasing to \$5.25 billion by 2030.⁷⁷²

- 8.22 Based on this evidence, there can be no doubt that Western Australian industry should be able to benefit from the ability to produce natural gas locally.

770 Closed hearing, Transcript of Evidence, 19 March 2014. Submission No. 57, Closed Submission, 1 April 2014.

771 *ibid.*

772 *ibid.*

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- 8.23 In effect, this is exactly why a 2011 parliamentary report entitled *Inquiry into domestic gas prices* (the 2011 Report) opened with the observation that ‘Western Australia’s economic future is inexorably tied to the development and use of the state’s large reserves of natural gas.’⁷⁷³
- 8.24 Many of the submissions made in the 2011 Inquiry were concerned with the forecast domestic supply of natural gas. Some submissions made to the present Inquiry were similar. The Committee does not propose to explore these matters in any great level of detail here. Instead, the Committee regards the 2011 Report as an accurate and useful account of the issues currently and potentially faced by consumers in the Western Australian domestic gas market. That is, the Committee endorses the 2011 Report.
- 8.25 Nonetheless, while this present report arises out of a new Committee’s examination of a very different aspect of WA’s petroleum industry, many of the themes and much of the evidence explored in the 2011 Report remain relevant. In particular, there is a fundamental question common to both Inquiries: how best to achieve a balance between domestic use and export of what is a valuable, strategic resource.

An enabling industry

- 8.26 The 2011 Report observed that ‘LNG projects have been termed “enablers” of domestic gas by [LNG] producers who claim that these projects improve diversity of supply and competition for the local market.’⁷⁷⁴ It was further explained that:

*LNG projects are prohibitively expensive undertakings that require voluminous long-term contracts with offshore entities to underwrite their profitable development. The comparatively smaller demand requirements of the domestic market, while not insignificant, do not meet this criterion. Through the development of these larger fields, predominantly for export, there is potential for the domestic market to access incremental supplies that would otherwise remain untapped.*⁷⁷⁵

- 8.27 Though many factors bear upon the cost of any natural gas project, essentially the size of a gas field and the cost of developing it are closely related. The cost of servicing the capital outlay—to say nothing of the capital outlay itself—required to develop many of the gas fields off the coast of WA would very likely exceed the revenue that would be generated by selling the produced gas in the domestic market. That is, the fields that supply the North West Shelf project, for example, could not have been fully developed without the revenue generated by the project’s export venture.

773 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Perth, 24 March 2011, p ix.

774 *ibid*, p 77.

775 *ibid*.

8.28 This is underlined by the position taken by the DomGas Alliance, which ‘aims to promote diversity, affordability and security of gas supply for industry and households in Western Australia.’⁷⁷⁶ At a Committee hearing, the Executive Director of the DomGas Alliance, Mr Matthew Browne:

*strongly state[d] and reinforce[d] that the alliance is not anti-LNG. The commercial potential of LNG exports, dating back to the development of the North West Shelf, has helped unlock allocations for domestic gas, albeit largely with state government leadership or policy intervention.*⁷⁷⁷

8.29 Though not on the same scale as the LNG plant, the significance of the domestic gas component of the North West Shelf plant should not be underestimated: since it first began production in 1984, it has supplied the vast majority of gas that has been consumed in the Western Australian market. Even today its 630 TJ per day capacity makes it by far and away the largest domestic gas plant in WA.⁷⁷⁸ As such, the North West Shelf plant demonstrates the manner in which an LNG project, in addition to supplying foreign buyers, can effectively unlock a steady supply of natural gas for Western Australian consumers.

Gas reservation

8.30 As was broadly outlined in Chapter 1, the Western Australian Government has always made development of LNG plants contingent upon a commitment by the operators of any prospective export project to supply some gas into the domestic market. The original mechanism used by government for this purpose was a State Agreement, defined as a contract ‘ratified by an Act of the State Parliament.’⁷⁷⁹

776 DomGas Alliance, *About us*. Available at: <http://www.domgas.com.au/aboutUs.html>. Accessed on 17 March 2014.

777 Mr Matthew Brown, Executive Director, DomGas Alliance, *Transcript of Evidence*, 15 November 2013, p 2.

778 There are currently five natural gas processing plants operating in WA. These are the North West Shelf plant (which has a production capacity of 630 TJ per day), the East Spar JV (270 TJ/day) and Harriet JV (120 TJ/day) plants on Varanus Island, the Devil Creek plant (220 TJ/day), and the Macedon plant (200 TJ/day). See Independent Market Operator, *Gas statement of opportunities*, January 2014, p 36. Available at: http://www.imowa.com.au/docs/default-source/publications-and-reporting/general-documents/gsoo_2_report_final95222D27BB75.pdf. Accessed on 20 March 2014.

779 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Perth, 24 March 2011, p 79.

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- 8.31 The first State Agreement was enacted in 1979 for the North West Shelf project. As party to that agreement, the North West Shelf Joint Venture partners agreed to deliver a significant quantity of gas to the local market for a period of at least 20 years. The agreement was revised in 1995 to oblige the North West Shelf partners to supply a total of 5,064 PJ of gas into the domestic market. In the 2011 Report, it was noted that:

*while this commitment is expected to be met by 2014, there is also a provision requiring the joint venture to consult and reach agreement with the Minister [for Mines and Petroleum] ‘on the requirements in the State and the manner in which they will be met’ before entering into new export contracts between 2010 and 2025.*⁷⁸⁰

- 8.32 The second State Agreement to sanction the export of LNG from WA also contained a clause reserving a quantity of the project’s gas for the domestic market. Under the *Barrow Island Act 2003* (WA), proponents of the Gorgon project are required to supply at least 2000 PJ of natural gas into the domestic market over the life of the project.⁷⁸¹ Project proponents must meet this obligation by building a two-train, 300 TJ per day capacity ‘Domgas Project.’⁷⁸² The Committee notes that the Gorgon LNG plant will have the capacity to produce 15.6 million tonnes of LNG per annum, making the 300 TJ per day production capacity of the ‘Domgas Project’ approximately 13 per cent of the LNG plant production capacity.⁷⁸³

- 8.33 Subsequent to the Gorgon project State Agreement, the state government implemented a formal gas reservation policy that would apply to all future LNG export projects, releasing a discussion paper on the topic in February 2006. In October 2006 the ‘WA Government policy on securing domestic gas supplies’ (Reservation Policy) was adopted.⁷⁸⁴ The Reservation Policy was essentially based around three specific points. First, the government gave an outline of the natural gas resources in the vicinity of WA, explaining that:

Western Australia has approximately 120 trillion cubic feet (Tcf) of proved and probable reserves of natural gas. Allowing for likely future

780 *ibid.*

781 *ibid.*

782 Section 17 *Barrow Island Act 2003* (WA).

783 Though the specific energy content of LNG depends on the composition of the gas in question, at an approximate 55 GJ per tonne 15.6 million tonnes of LNG would yield 858 000 TJ of energy. Meanwhile, a 300 TJ per day natural gas plant would produce 109 500 TJ of gas in one year – about 12.8 per cent of the 858 000 TJ in 15.6 million tonnes of LNG.

784 Department of Premier and Cabinet, *WA Government policy on securing domestic gas supplies*, October 2006. Available at: <http://www.warregoenergy.com/downloads/documents/wa%20government%20policy%20-%20securing%20domestic%20gas%20supplies.pdf>. Accessed on 17 March 2014.

*discoveries, the ultimately recoverable gas resource may be in the order of 200 Tcf.*⁷⁸⁵

8.34 Second, the Government gave its forecast for future domestic gas consumption:

*Current domestic consumption is about 0.3 Tcf a year. If demand does not change, the State would require 14 Tcf of gas over the next 50 years. Under a more realistic 3 percent growth rate scenario, aggregate domestic gas demand to 2055 would total 32 Tcf, equivalent to around 15 percent of forecast ultimately recoverable gas reserves of approximately 200 Tcf.*⁷⁸⁶

8.35 Third, the Government observed that there would likely be significant growth in the export of LNG from WA:

*A number of new LNG projects have been proposed for Western Australia, to take advantage of increased global demand (and prices). The industry has set a target level of production of 50 mpta [sic] of LNG by 2015. An increase in LNG production to 50mtpa by 2015, maintained at that level of production for 40 years (equivalent to 2 x 20 year contract periods) would consume 113 Tcf of gas, effectively all of Western Australia's presently known gas reserves.*⁷⁸⁷

8.36 Taking all of this into account, the government announced that, with an 'objective... to secure domestic gas commitments up to the equivalent of 15 per cent of LNG production,' it would:

*negotiate with proponents of export gas (LNG) projects to include a domestic gas supply commitment as a condition of access to Western Australian land for the location of processing facilities.*⁷⁸⁸

8.37 It was also announced that the 15 per cent figure would be applied in a flexible manner:

Negotiations with companies will continue to be conducted on a case-by-case basis to take account of the different characteristics of each project (size and accessibility of the resource, potential markets, appropriate timeframe for delivery etc), but the principles informing

785 *ibid*, p 3.

786 *ibid*.

787 *ibid*.

788 *ibid*, p 4.

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*those negotiations will be sufficiently consistent and transparent to ensure predictability and equity.*⁷⁸⁹

- 8.38 Woodside's Pluto project was the first to be developed subsequent to the adoption of the Reservation Policy. It was noted in the 2011 Report that Woodside, in being given permission to construct the Pluto plant on the Burrup Peninsula, had:

*agreed to supply the equivalent of 15 per cent of LNG production as domgas within five years of the first Pluto LNG shipment, or after the 30 millionth tonne of LNG has been exported.*⁷⁹⁰

- 8.39 The Committee notes that the first shipment of LNG produced by the Pluto plant departed on 12 May 2012. At present the Pluto plant is able to produce 4.3 million tonnes of LNG annually, 15 per cent of which would be in the order of 80 TJ per day. As yet, however, Woodside have given no firm indication as to how or when it intends to begin meeting its domestic gas commitment.

- 8.40 Chevron's Wheatstone project was the second to proceed under the terms of the Reservation Policy. In addition to the LNG plant, a 200 TJ per day domestic gas plant is presently under construction at the Wheatstone site.

- 8.41 As was the case during the 2011 Inquiry, the Reservation Policy continues to polarise opinion. In the course of this current Inquiry, oil and gas companies and their representatives argued that the reservation policy is, at best, unnecessary. In the submission made by the Australian Petroleum Production and Exploration Association (APPEA), it was asserted that:

*domestic gas reservation policies do not improve supply but act to inhibit the development of further sources of supply. Policy measures that encourage efficient investment, competition and transparency in the WA domestic gas market are a better approach to delivering competitive pricing than reservation.*⁷⁹¹

- 8.42 APPEA's Chief Operating Officer (Western Region), Mr Stedman Ellis, further explained this point in evidence before the Committee:

...the domestic gas reservation policy, which Western Australia alone across Australia has introduced, appears unnecessary on the evidence. The evidence of the state's Independent Market Operator in its

789 *ibid.*

790 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Perth, 24 March 2011, p 79.

791 Submission No. 12 from Australian Petroleum Production and Exploration Association, 30 August 2013, p 21.

*assessment of supply and demand shows that there is more than adequate supply in the market to meet demand. It also appears to be unnecessary on the evidence of what we have seen happen in recent years in the local gas market. Both at Devil Creek and Macedon we have seen projects developed completely independent of domestic gas reservation, focused on the domestic market. That reflects the market working. So it is an unnecessary policy based on the evidence, but it is also a disincentive and a cost for project proponents looking at remote fields that may be able to be commercialised by FLNG. So it represents an additional regulatory burden. It is unnecessary.*⁷⁹²

8.43 As Mr Ellis noted, in June 2013 the Western Australian Independent Market Operator (IMO) released its first *Gas statement of opportunities (GSOO)*, which painted an extremely optimistic picture of gas supply in WA from 2013 to 2022. Unfortunately, however, the methodology upon which the IMO based its assessment was flawed: the IMO's domestic gas supply forecast was effectively the aggregated domestic gas processing capacity in WA. While there certainly exists ample gas processing capacity in WA, the ability to process gas is very different to the actual production of gas for the marketplace.

Finding 47

Domestic gas processing capacity is not the same as the amount of domestic gas that is produced for supply to the domestic gas market.

8.44 It is clear that there is currently a significant and steady demand for natural gas within the Western Australian domestic market. Conversely, the extent to which this demand may grow in the future is difficult to ascertain. The Committee notes that the first *GSOO* forecasted only very moderate growth in domestic demand for natural gas of 1.1 per cent per annum through until 2022,⁷⁹³ and that this forecast was downgraded further by the IMO in January 2014 to just 0.4 per cent per annum through until 2023.⁷⁹⁴ While the IMO's forecasts may well prove to be accurate, the Committee believes that the continued availability of a reliable supply of natural gas in the WA marketplace would more likely lead to more significant annual demand growth. Indeed, the Committee is aware of a latent but frustrated desire by some parts of Western Australian industry to use natural gas as a substitute for diesel fuel.⁷⁹⁵ The Committee

792 Mr Stedman Ellis, Chief Operating Officer, Western Region, Australian Petroleum Production and Exploration Association, *Transcript of Evidence*, 1 November 2013, p 4.

793 Independent Market Operator, *Gas statement of opportunities*, July 2013, p 6. Available at: http://www.imowa.com.au/docs/default-source/publications-and-reporting/gsoo_1_report_final.pdf?sfvrsn=0. Accessed on 3 April 2014.

794 Independent Market Operator, *Gas statement of opportunities*, January 2014, p 7. Available at: http://www.imowa.com.au/docs/default-source/publications-and-reporting/general-documents/gsoo_2_report_final95222D27BB75.pdf. Accessed on 3 April 2014.

795 Closed hearing, *Transcript of Evidence*, 19 March 2014, p 2.

believes that present uncertainty as to the future availability of natural gas from the North West Shelf domestic gas plant is functioning to restrict domestic demand growth. In turn, this threatens to undermine the growth of the state economy.

Finding 48

There is significant demand for domestic gas in Western Australia. Without certainty of supply, economic development in the state will be negatively impacted.

8.45

The flawed nature of the first *GSOO* was confirmed with the January 2014 release of the second instalment of the publication, for which the forecast methodology had been significantly altered. Where the July 2013 publication had found that ‘there is expected to be adequate gas supply to meet forecast demand in the domestic market,’ and that ‘existing gas reserves are forecast to be sufficient to continue to meet 2022 domestic and LNG demand levels for a very considerable period beyond 2022,’⁷⁹⁶ the January 2014 was more circumspect. According to the current *GSOO*:

- *as WA has an abundance of gas reserves and existing and planned gas processing capacity, these are not meaningful measures of supply to the domestic market. Rather, it is important to consider the extent to which this gas will be made available to the domestic market (the ‘potential supply’);*
- *there is likely to be adequate potential gas supply to meet existing contracted gas demand and expected growth in gas demand in the domestic market for the 2014 to 2020 period assuming that commercially acceptable terms can be agreed between suppliers and customers; [and]*
- *for the 2021 to 2023 period, the availability of gas to the WA domestic market is likely to be sufficient if the North West Shelf (NWS) Joint Ventures (JVs) supply at levels considered in the Upper potential supply forecasts, but may not be sufficient (at forecast prices) to meet forecast domestic demand if the NWS JVs do not supply gas to the domestic market beyond existing contracts (as reflected in the Lower potential supply forecasts).⁷⁹⁷*

8.46

In effect, the January 2014 *GSOO* calls into question the preparedness of LNG project operators to supply gas into WA’s domestic market, and paints a dire picture of what consumers in that market are faced with, particularly if the North West Shelf gas plant

796 Independent Market Operator, *Gas statement of opportunities*, July 2013, p 5. Available at: http://www.imowa.com.au/docs/default-source/publications-and-reporting/gsoo_1_report_final.pdf?sfvrsn=0. Accessed on 20 March 2014.

797 Independent Market Operator, *Gas statement of opportunities*, January 2014, p 4. Available at: http://www.imowa.com.au/docs/default-source/publications-and-reporting/general-documents/gsoo_2_report_final95222D27BB75.pdf. Accessed on 20 March 2014.

ceases to supply domestic gas. The Committee considers the most recent *GSOO* to stand as clear evidence of the importance of using government policy to ensure that an adequate quantity of natural gas is supplied to the domestic market into the future.

Finding 49

Without Commonwealth and Western Australian Government policy to ensure supply of natural gas to the domestic market, the future supply to domestic gas consumers is at risk.

Recommendation 21

Given the emergence of FLNG, the Western Australian Government work with the Commonwealth Government to develop an energy policy that secures domestic gas supply.

8.47 The commitment by Chevron to supply up to 300 TJ per day into the domestic market from the Gorgon plant (an outcome facilitated prior to the adoption of the formal Reservation Policy, but nonetheless facilitated via a State Agreement) as well as a further 200 TJ per day from the Wheatstone plant (an outcome facilitated by the Reservation Policy) stands as testament to the importance of the Reservation Policy.

8.48 The Managing Director of Chevron, Mr Roy Krzywosinski, explained that Chevron is philosophically opposed to the Reservation Policy:

*[I]f you take a look at any kind of domestic market policy reservation, it may feel good in the short term, but I think in the long term it is going to create anomalies and other inequities. It is an artificial constraint that I think is going to have a long-term detriment because other investments may not be able to carry the burden of the 15 per cent domestic market obligation.*⁷⁹⁸

8.49 Mr Krzywosinski cited activity in the United States (US) market for natural gas as evidence against the need for a reservation policy:

When I look at the US, it was in 2005—before I arrived I looked at the Henry Hub spot price; in the fourth quarter it was over \$13 an MCF—13 bucks! There was no reservation policy, but there were free market forces that said, “Wow! There’s some money to be made here.” It unleashed the whole army, if you will, of drill rigs. The free market forces went out and developed the concept of shale gas. In a matter of four years the Henry Hub domestic spot price went from \$13 down to

798 Mr Roy Krzywosinski, General Manager, Chevron, *Transcript of Evidence*, 24 October 2013, p 7.

*about \$3... So there is an example where free market forces typically provide the checks and balances.*⁷⁹⁹

8.50 While the Committee supports the general premise of Mr Krzywosinski's evidence, the US must be regarded as an atypical example of how market forces can impact upon prices for petroleum products. However successful other countries may be in the future exploration for, and production of, shale gas, for a number of reasons it is highly unlikely that the success experienced in the US will be replicated. In particular, it must be recognised that shale gas exploration and production in the US benefitted immensely from an established and thorough understanding of the country's subterranean geography, the widespread availability of capital equipment required for drilling, and the existence of sophisticated gas pipeline infrastructure. The mere existence of shale gas does not guarantee its successful production—what has been referred to at the 'shale gas boom' in the US must be attributed to the convergence of a number of important factors.⁸⁰⁰

Finding 50

The success of the United States' expansion of its shale gas production is attributable to the convergence of a number of factors, including:

- a long term and thorough understanding of the subterranean geography;
- technological development;
- the widespread availability of drilling equipment;
- an existing sophisticated gas pipeline infrastructure; and
- the size of the natural gas market in the US.

8.51 Furthermore, the Committee notes that a February 2014 interview with *WA Business News*, the former Chief Executive Officer of Verve Energy, Ms Shirley In't Veld, underscored the importance of the Reservation Policy. According to Ms In't Veld:

*when Verve was negotiating the gas supply agreement with Gorgon, Roy Krzywosinski did say to me that if it were not for that policy, there is no way [Chevron] would have put any gas into the domestic market.*⁸⁰¹

8.52 Whatever Chevron's reason for committing to supply gas into the Western Australian domestic market from the Gorgon and Wheatstone plants, it is clear that this is an excellent outcome for the state. The Committee also acknowledges, however, that applying the Reservation Policy is far from simple. As Mr Krzywosinski's evidence

799 *ibid.*

800 Resources for the Future, *US shale gas development: What led to the boom?*, May 2013, pp 1-2. Available at: <http://www.rff.org/RFF/Documents/RFF-IB-13-04.pdf>. Accessed on 21 March 2014.

801 *WA Business News, Former energy chief reflects on Verve*, 24 February 2014. Available at: <http://www.businessnews.com.au/article/Former-energy-chief-reflects-on-Verve>. Accessed on 19 March 2014.

highlights, there is a fine balance between exploration and production in the market for natural gas. In effect, the market price for natural gas needs to be sufficient to encourage and support continued exploration.

8.53 This was explained by the Minister for Energy, Hon Dr Mike Nahan, MLA, who had been Chairman of the Committee during the 2011 Inquiry into domestic gas prices. Dr Nahan first addressed Mr Krzywosinski's evidence, and then explained his support for the Reservation Policy:

First, the US does have a reservation policy. It reserves all its gas and petroleum resources for use in the US. It bans exports, even to Canada, although it has changed that a bit. Gas fields and oil fields were discovered in Alaska, and they were huge, and one of the policies was to bring that over to Japan rather than all the way down to California to be processed, but that was banned. So the US has had for decades a policy of reserving its petroleum resources for the use of the US. That is a statement of fact.

Second, what he is raising is that if you go overboard with a reservation policy and you destroy totally the pricing, you will get less exploration. That is not so much on LNG, because the reservation policy is just not significant for them. But if you were able to flood the market with excess gas through a reservation policy for an LNG project, you would bring the price down, but you would destroy any incentive for onshore discoveries. Let us face it, we want those onshore discoveries, and that would be much better, because it would all become domestic, and that would provide a great deal of certainty to our market. So it is a fine art as to how much you reserve and then feed back in price... I think we have got it more or less right, both in terms of the quantum—15 [per cent]—and the fact that it is negotiable, and in telling them that we are open for doing deals in how they deliver it. I think we have got the policy more or less right.⁸⁰²

8.54 Two important aspects of the Reservation Policy must be highlighted. First, while the policy notionally requires LNG project proponents to commit to supplying the equivalent of 15 per cent of LNG production into the domestic market, the implementation of this policy is subject to negotiation with government. Second, prices and contracts for the supply of gas provided into the marketplace under the Reservation Policy are determined by the market. While it may be that the operator of an LNG project would prefer to sell high volumes of gas as LNG to energy-poor

802 Hon Dr Mike Nahan, Treasurer; Minister for Energy; Citizenship and Multicultural Interests, WA Government, Closed hearing, *Transcript of Evidence*, 5 December 2013, p 7.

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countries willing to pay lucrative prices, the Committee understands that domestic gas prices in WA have historically been negotiated to cover the cost of development and to provide a reasonable rate of return on investment to the producer.

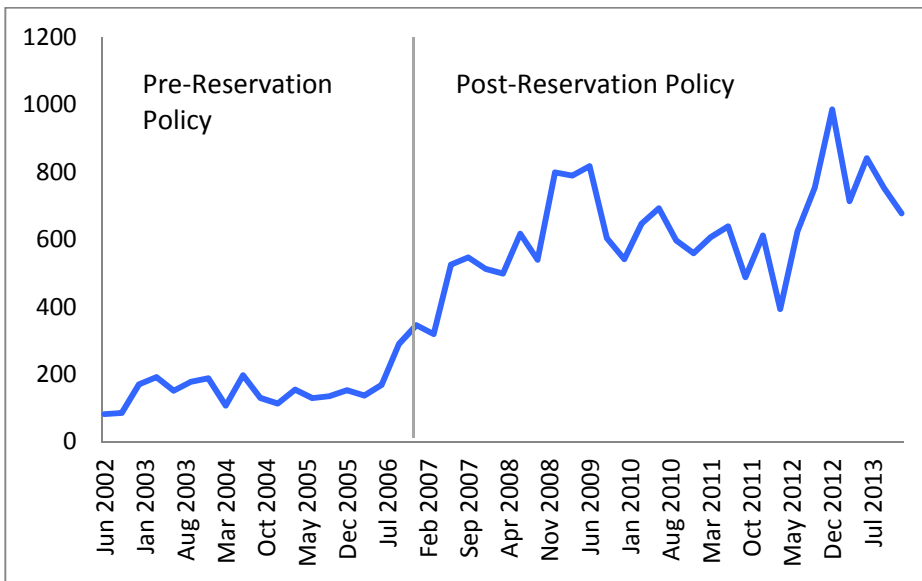
8.55 However, evidence to the Committee suggests that new contracts tend to be based on an LNG netback with an oil price escalator. This results in a significantly higher cost and less price certainty.

8.56 The Committee rejects the assertion that the Reservation Policy acts as an impediment to LNG project investment. The Reservation Policy is a clear and unambiguous statement by the WA Government that Australian natural gas should not be exported at the expense of domestic consumers. Furthermore, the Reservation Policy did not impede Chevron's decision to proceed with the Wheatstone project, as Mr Krzywosinski explained:

*it is important when companies make decisions to understand the parameters of the investment. Whether it is domestic gas or whatever other requirements might be out there, you need to understand the demands of the investment. You need to understand how that money will be used and so on and so forth. We understood that situation for Wheatstone. We went into that investment with eyes wide open that there would be a domestic gas reservation policy. As a result, we are doing it; we are providing domestic gas. Between Gorgon and Wheatstone there is 500 terajoules a day, as you mentioned. That represents probably over 40 per cent, probably close to 50 per cent, of the current market. That is good news—there is more domestic gas, more competition. It is good news for everybody.*⁸⁰³

8.57 The Committee agrees with Mr Krzywosinski's assessment that the combined future supply of 500 TJ of natural gas into the domestic market from the Gorgon and Wheatstone plants is good news. Furthermore, data on petroleum exploration expenditure in WA does not suggest that the adoption of the Reservation Policy has in any way impeded petroleum exploration expenditure in this state, as is illustrated in Figure 8.4.

803 Mr Roy Krzywosinski, General Manager, Chevron, *Transcript of Evidence*, 24 October 2013, p 7.

Figure 8.4: Petroleum exploration expenditure in WA, \$millions⁸⁰⁴

8.58

The Committee also notes that the 2011 Report expressed total support for the Reservation Policy. In particular, Finding 19 in the 2011 Report was unequivocal:

*The Domestic Gas Reservation Policy is an essential policy instrument for ensuring that an appropriate level of gas is supplied into the local market to achieve reasonable price outcomes.*⁸⁰⁵

8.59

The Committee agrees with this assessment.

Finding 51

The Policy on Securing Domestic Gas Supplies (the Reservation Policy) is an essential policy instrument for ensuring that an appropriate level of gas is supplied into the local market.

Recommendation 22

The Western Australian Government retain its Policy on Securing Domestic Gas Supplies (the Reservation Policy).

⁸⁰⁴ Source data obtained from the Australian Bureau of Statistics, *8412.0 – Mineral and petroleum exploration, Australia (petroleum exploration, expenditure by state and territory)*, December 2013. Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8412.0Dec%202013?OpenDocument>. Accessed on 20 March 2014.

⁸⁰⁵ Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Perth, 24 March 2011, p 76. The Finding goes on to say: 'This instrument should be part of a suite of policy responses, the primary aim of which should be to improve the overall level of liquidity, competition and transparency in the Western Australian domestic gas market.'

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8.60 In the context of government policy, mention must also be made of Finding 26 of the 2011 Report, which stated that:

*the current process underpinning the application for and renewal of retention leases lacks sufficient rigour and enables the stockpiling of gas reserves by incumbent producers. These reserves may include fields that are suitable for the development of domestic supplies.*⁸⁰⁶

8.61 Though this issue was covered in Chapter 2, it bears additional mention. The Committee has noted commentary by law firm Clayton Utz regarding the pronounced intention by the current federal Coalition Government to ‘verify that Retention Leases granted under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) are being held for “a legitimate need to secure gas for long-lived production projects” and not to “obtain a competitive commercial advantage.”⁸⁰⁷ The Committee believes that there would be significant merit in the federal government articulating specific criteria by which it intends to assess future compliance with Retention Lease obligations.

8.62 The Committee heard evidence that there may be some gas fields off the coast of WA that, while possibly not commercially viable as LNG projects, could be commercially viable for a domestic gas project. Where Retention Leases pertaining to these fields are renewed, their potential commercial viability is not properly tested by the market.⁸⁰⁸

8.63 A consultants’ report provided in support of this claim contains extensive commentary. The report points out that:

*in Western Australia there are currently 35 retention leases, 17 of which have been renewed more than once and hence have a duration of greater than five years. For example, one retention lease was first granted in 1987 and is due to expire in 2015. This means that to date, 27 years have passed since the initial retention lease was granted and this field has not been developed. Retention leases are granted, however, with the expectation of reserves being developed within 15 years.*⁸⁰⁹

8.64 The report then gives projected rates of return on two projects that would develop fields that have long been covered by Retention Leases for supply into the domestic

806 Economics and Industry Standing Committee, *Inquiry into domestic gas prices*, State Law Publisher, Perth, 24 March 2011, p 109.

807 O’Sullivan, Kevin and Wiese, Peter, Clayton Utz, *Greater scrutiny of offshore Retention Leases under proposed “use it or lose it” policy*, 10 October 2013, Available at: http://www.claytonutz.com/publications/edition/10_october_2013/20131010/greater_scrutiny_of_offshore_retention_leases_under_proposed_use_it_or_lose_it_policy.page. Accessed on 19 December 2013.

808 Closed hearing, *Transcript of Evidence*, 19 March 2014, p 3.

809 Closed evidence, Closed Submission No. 61, 1 April 2014, p 8.

market. For these projects, the per gigajoule price for delivering a 12 per cent rate of return is suggested as \$4.21 and \$5.74 respectively. Both figures indicate that these two fields, which the leaseholders have designated as being not commercially viable for many years, could be viably developed for the domestic market. As such, the report states that:

*if the government was to apply the retention lease policy more rigorously then we would expect more domestic supply to come online to meet domestic demand, thereby delinking the domestic supply and pricing from the LNG market. Such conditions would make the current domestic gas reservation policy redundant.*⁸¹⁰

8.65 Whether or not there is general agreement on the consultant's report findings, the Committee strongly supports the call for increased transparency in the Retention Lease renewal process. Furthermore, the Committee believes that the renewal process should assess the commercial viability of developing a gas field for supply into the domestic market as a higher priority than the commercial viability of developing a gas field for export as LNG.

Finding 52

There is a need for greater transparency of the Commonwealth Government's Retention Lease renewal process.

Recommendation 23

The Western Australian Government urge the Commonwealth Government to increase the transparency of the Retention Lease renewal process through measures including, but not limited to:

- developing specific criteria for the assessment of future compliance with Retention Lease obligations;
- clarifying the specific meaning of the term 'commercially viable' in section 142 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth);
- acknowledging the commercial viability of the development of gas fields for supply into the domestic market rather than for LNG exports;
- allowing third-party submissions in the process of determining an application to renew a Retention Lease; and
- requiring the Commonwealth to undertake due diligence on the proposal.

810 Closed evidence, Closed Submission No. 61, 1 April 2014, p 12.

LNG

- 8.66 The Committee observed in Chapter 1 that LNG is not so much a product as a technology. In the US and throughout much of Europe, indeed, in WA, natural gas is generally conveyed from producer to consumer in gaseous form via pipeline.⁸¹¹ For transcontinental gas supply, however, pipelines are either impossible, or at the very least impractical. Bypassing the need for any such pipelines, gas liquefaction permits significant quantities of natural gas to be shipped from producers to consumers all over the world.
- 8.67 For present purposes Woodside's Pluto plant, which is currently a single-train, LNG-only facility, provides the most straightforward demonstration of the way in which gas liquefaction enables an Australian producer to supply, for example, a Japanese customer with natural gas. Raw gas from the Pluto field is brought through a 180 kilometre flowline to the Pluto plant, where it is refined until suitable for liquefaction.⁸¹² After being refined, the gas is then pumped into the liquefaction train, which refrigerates the gas until it condenses into a liquid. This liquid—LNG—is then stored in one of two large cryogenic storage tanks at the Pluto plant, until such time as one of the four LNG tankers that service the Pluto plant is ready to be loaded.⁸¹³ Once loaded, the tanker departs Karratha and begins what is approximately a twelve-day journey to Japan.⁸¹⁴
- 8.68 Upon arrival in Japan the process is effectively reversed. The cargo is first offloaded into a cryogenic storage tank; it is then fed as required into a regasification terminal, where it is gradually warmed under high pressure until it vaporises back into natural gas.⁸¹⁵ This gas is then fed into Japan's gas pipeline infrastructure, which allows it to be conveyed to consumers around the country.
- 8.69 Though the Pluto plant does not currently supply gas into the domestic market, the refined gas that is fed into the Pluto liquefaction train is broadly similar to the gas that is produced by the nearby North West Shelf domestic gas plant and pumped into the Dampier to Bunbury Natural Gas Pipeline (DBP).⁸¹⁶ That is, when Woodside begins

811 In some cases, including within WA, LNG is used to convey natural gas overland to places not serviced by pipeline infrastructure.

812 Woodside Petroleum, *Pluto LNG*. Available at: <http://www.woodside.com.au/Our-Business/Pluto/Pages/default.aspx>. Accessed on 21 March 2014.

813 *ibid*.

814 MarineTraffic, *Woodside Rogers*. Available at: http://www.marinetraffic.com/en/ais/details/ships/241254000/vessel:WOODSIDE_ROGERS. Accessed on 21 March 2014.

815 Total, *Regasification of LNG: strategic access to markets*. Available at: <http://total.com/en/energies-expertise/oil-gas/trading-shipping/fields-of-expertise/transportation-storage/regasification>. Accessed on 21 March 2014.

816 Though refined 'natural gas' consists primarily of methane, it is a hydrocarbon gas mixture that can also contain varying amounts of higher energy content alkanes, such as ethane and propane.

supplying natural gas in satisfaction of the Reservation Policy requirement associated with the Pluto project, that gas will be supplied directly into the DBP as refined natural gas. However this requirement will be met, it is worth noting that gas feeding the Pluto plant is refined onshore.

8.70 The Committee understands that there are two companies in WA—Energy Developments Limited in Karratha, and EVOL LNG in Kwinana—that purchase natural gas from the DBP and liquefy it for overland transport to places that are not serviced by gas pipeline infrastructure. In aggregate, these operations have the capacity to produce 375 tonnes of LNG per day—about 20 TJ worth (an amount equivalent to about 2 per cent of WA’s daily natural gas consumption).⁸¹⁷ That is, these two companies use LNG technology to serve a specific purpose; they do not purchase LNG, but rather produce it themselves using gas obtained from the DBP. Although LNG is used for some specific purposes in WA, it is a niche method of natural gas transport in this state.

8.71 For WA to receive shipments of natural gas as LNG, at least one regasification terminal would first need to be built, perhaps somewhere near the Kwinana industrial area on the coast. Cryogenic storage facilities, with the capacity to store an amount of LNG that would be at least four days’ aggregate supply, would be a crucial and extremely expensive component of any such terminal. An investment into infrastructure of this nature in WA seems highly unlikely. In evidence before the Committee, Dr Nahan confirmed that an option to construct such a facility as a method of facilitating gas storage in case of emergency had been discussed and dismissed by the state government. As Dr Nahan explained :

it is very expensive and you lose a lot of energy and gassing costs in the cooling and then the heating.

[...]

*We looked at it and it was just not cost effective. The Mondarra gas storage facility is a much more sensible solution than LNG.*⁸¹⁸

8.72 That LNG carriers are equipped to carry vast amounts of cargo is another complicating factor. The four LNG carriers that service the Pluto plant—*Woodside Donaldson*,

The specific energy content of refined natural gas thus depends on the presence and quantity of alkanes in the gas stream. These vary from field to field.

817 EVOL LNG, *About*. Available at: <http://www.evollng.com.au/about>. Accessed on 21 March 2014. Energy Developments, *LNG and CNG*. Available at: http://www.energydevelopments.com.au/01_cms/details.asp?ID=86. Accessed on 21 March 2014. The Committee notes that of its 200 tonne daily production capacity, the Energy Developments plant generally produces about 120 tonnes.

818 Hon Dr Mike Nahan, MLA, Treasurer, Government of Western Australia, Closed Hearing, *Transcript of Evidence*, 5 December 2014, p 6. The Mondarra storage facility is an underground gas storage facility located in the Perth Basin near Dongara, which interconnects both the Parmelia Gas Pipeline and the Dampier to Bunbury Natural Gas Pipeline. A depleted gas reservoir, the facility has 15 PJ of useable gas storage capacity.

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Woodside Rogers, LNG Ebisu and Energy Horizon—are each able to carry a cargo of between 62,000 and 74,000 tonnes of LNG.⁸¹⁹ This equates to between 3,300 and 3,900 TJ of energy, meaning that the cargo of a single LNG carrier contains LNG equivalent to about three to four days' supply of natural gas for the entire state. In a basic sense, LNG production occurs on a scale that is inappropriate for WA's domestic gas market.

8.73 The Committee also notes that pipelines, where available, represent a more energy-efficient method of transporting natural gas than using LNG technology. A 2009 report prepared by the European Commission's Joint Research Centre (Institute for Energy) compared LNG and pipeline chains as methods of delivering natural gas, and noted that 'the LNG route... is on average more energy intensive than a conventional pipeline chain.'⁸²⁰ According to the report:

the typical energy penalty of delivering gas via pipelines is 10–15% (translating into an efficiency of 85–90%), while for LNG it is ≈25% (efficiency of ≈75%).

[...]

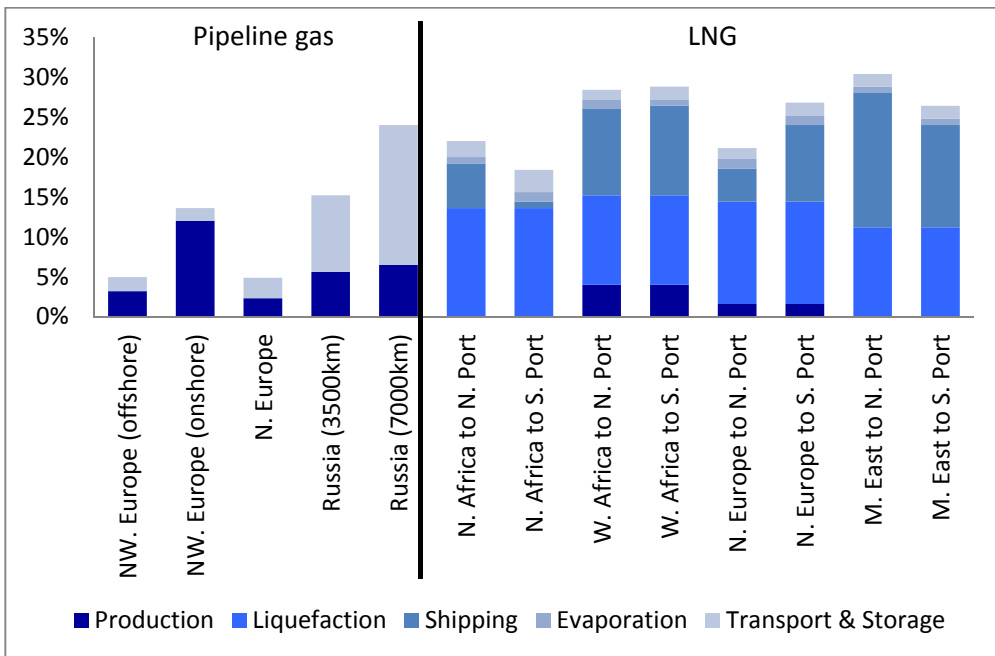
*[A]ll things being equal (i.e. assuming that the gas has already been extracted from the ground), the break-even point between the logistics energy use... of LNG and pipeline gas is only reached if the transportation distances are very long... This means that, practically speaking, LNG will always be a more energy-intensive option than pipeline deliveries of natural gas.'*⁸²¹

8.74 Figure 8.4, reproduced from the European Commission report, illustrates the difference in energy efficiency by comparing several European pipeline and LNG supply chains.

819 *Woodside investor site tour*, Media Statement, Woodside Petroleum, 29 May 2012.

820 European Commission Joint Research Centre, Institute for Energy, *Liquefied natural gas for Europe—some important issues for consideration*, 2009, p14. Available at: http://ec.europa.eu/dgs/jrc/downloads/jrc_reference_report_200907_liquefied_natural_gas.pdf. Accessed on 19 March 2014.

821 *ibid.*

Figure 8.4: Primary energy consumption to deliver natural gas by LNG and pipeline throughout Europe⁸²²

8.75

While acknowledging the importance of the technology that allows for the production and transport of LNG, it is a technology that ought to be unnecessary in the Western Australian domestic gas market. Owing to the existence of the DBP and the vast reserves of natural gas that lie off the coast, there is no reason why WA should be a market for LNG.

Finding 53

The delivery of natural gas into the Western Australian domestic gas market via LNG tankers and regasification terminals would not be cost effective or competitive in comparison with transporting gas by pipeline.

Floating LNG

8.76

In a very basic sense, Shell's Prelude FLNG vessel consists of a slightly smaller version of Woodside's Pluto plant sitting atop a barge, the barge itself being moored to float directly above the gas fields (Prelude and Concerto) that it will develop. Gas from these fields will be fed into the Prelude vessel, where it will undergo largely the same process that takes place at the Pluto plant: the raw gas stream will first be refined before it is liquefied and then stored, before ultimately being loaded onto an LNG tanker for

⁸²² *ibid*, pp 13-14. In calculating primary energy consumption figures on which this chart is based, the European Commission Joint Research Centre assumed the point of delivery to be 'approximately in the middle of continental Europe.' The 'N. Port' LNG import terminals are specified as being on the Atlantic Coast, while the 'S. Port' LNG import terminals are specified as being on the Mediterranean coast.

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export. The obvious difference with the Prelude vessel is that every step of this process will occur at sea.

8.77 The Prelude vessel, and FLNG technology generally, will only be able to produce LNG. In that WA has no infrastructure for receiving LNG, it is plain that FLNG technology is appropriate only as a method for exporting Australia's natural gas resources. As the Executive Director of the DomGas Alliance, Mr Matthew Brown, pointed out, 'with FLNG not one molecule of gas would land in WA.'⁸²³

8.78 On the question of how a field developed using FLNG technology might supply WA's domestic market with natural gas, the DomGas Alliance submitted that 'a strong, effective and transparent mechanism could be implemented to balance the needs of producers with those of domestic consumers.'⁸²⁴ Furthermore, the DomGas Alliance argued that two 'key features' of any such mechanism could include:

- *An obligation [to supply natural gas into the domestic market] would attach to the individual company, not a joint venture (Companies could trade commitment within their own organisation or with third parties. For example there is sufficient gas in the Carnarvon Basin to offset obligations from Browse or Prelude); [and]*
- *An obligation [to supply natural gas into the domestic market] should apply to both production and reserves (This would ensure any commitment is maintained with new discoveries and when new fields are added to an existing LNG project).'*⁸²⁵

8.79 While acknowledging that '[i]n the case of proposed FLNG developments, there would be no economically viable physical means of providing gas molecules from the fields',⁸²⁶ Shell's submission argued against the imposition of any such aggregated supply obligation. According to Shell:

while the concept of FLNG providing domestic gas through some sort of "offset" arrangement has been mooted, this concept has commercial and technical difficulties which may challenge its feasibility. These complexities arise from the numerous entities involved (various gas joint ventures, domestic gas customers, LNG customers, infrastructure owners, LNG terminal and ship owners etc)

823 Mr Matt Brown, Executive Director, DomGas Alliance, *Transcript of Evidence*, 15 November 2014, p 2.

824 Submission No. 9 from DomGas Alliance, 30 August 2013, p 4.

825 *ibid*, pp 4-5.

826 Submission No. 15 from Shell Australia, 30 August 2013, p 14.

*and the difficulties from aligning confidential terms in commercial contracts across the value chain.*⁸²⁷

- 8.80 Woodside's submission also acknowledged that 'there are no capabilities on the proposed FLNG facilities to process and export [sic] domestic gas for supply to existing domestic gas infrastructure.'⁸²⁸ According to Woodside, however:

*the adoption of new technologies provides opportunities for additional private or public investment in the development of complementary strategically located infrastructure.*⁸²⁹

- 8.81 This led Woodside to argue that:

*there is the potential for public and/or private development of LNG receiving terminals, and injection points to service the growth of FLNG developments and facilitate both state and national economic growth.*⁸³⁰

- 8.82 Woodside's submission also contained a 'case study' on 'strategic energy infrastructure,' in which it explained that 'in Japan there are 31 LNG regasification terminals that supply gas to a range of buyers,' and that '[i]n Singapore the Government supported the development of LNG import facilities to diversify supply and increase competition on the domestic market.'⁸³¹ The case study concluded with the statement that:

*while these markets are very different to the Western Australia context, investigating them can be useful in broadening our understanding of how other countries manage their energy supply and security.*⁸³²

- 8.83 The Committee agrees that the Japanese and Singaporean markets are indeed both 'very different' to the Western Australian natural gas market. Both countries are island nations that are only able to import natural gas, which gas is sourced from ever more distant producers. As such, both are increasingly reliant upon LNG as the method of supply. By contrast, WA has no infrastructure for receiving shipments of LNG because the existence of the DBP means that WA has no need for any such infrastructure.

827 *ibid.*

828 Submission No. 24 from Woodside Petroleum, 4 September 2013, p 14.

829 *ibid.*

830 *ibid.*

831 *ibid.*

832 *ibid.*

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Plainly, WA would not commit to receiving domestic gas as LNG from Australian gas fields—all of which are within 200 nautical miles of the WA coastline.⁸³³

Finding 54

Where it is used to develop Australian natural gas fields, FLNG is quite clearly an export-only technology.

Opportunity cost

8.84 Though various political, geographic, cultural and social factors bear heavily upon the global exchange of goods and services, a fundamental tenet of economics is that international trade is primarily driven by relative endowments of the factors of production. Where the specific factors required for the production of certain goods are relatively abundant in one country, that country is said to have a comparative advantage in the production those goods. For any country, goods requiring factors of production that are locally abundant will be cheaper to produce than goods whose factors of production are locally scarce.

8.85 In the contemporary world there are very few, if any, goods for which energy is not a factor of production. In fact, a steady supply of relatively cheap energy has the potential to unlock the productive capacity of numerous other factors. As such, a comparative advantage in energy can very easily be used to create a comparative advantage in other more valuable goods.

8.86 The very recent performance of the US economy, where real gross domestic product (GDP) grew at a rate of 3.2 per cent in the fourth quarter of 2013, demonstrates the economic impact of having access to domestically-produced, and thus relatively cheap, energy.⁸³⁴ Five years have passed since hydraulic fracturing technology first began to drive down the price of natural gas in the US to a level that is about one-third the price in Europe, and less than one-quarter of the price in Japan. Numerous US industries have benefited from the availability of this cheap natural gas; some of these benefits were recently outlined in an article in *The Economist* entitled 'From sunset to new dawn.' According to the article:

since 2011, 128 new energy-hungry industrial plants have been announced in the Gulf Coast region alone, with a combined value of

833 The Committee also notes that while LNG technology is often used as a method for enhancing security of natural gas supply, the Mondarra gas storage facility near Dongara renders this method unnecessary in WA. See APA Group, *Mondarra gas storage facility*. Available at: <http://www.apa.com.au/media/215259/apa-mondarra%20gas%20storage%20facility%20%20factsheet.pdf>. Accessed on 20 March 2014.

834 Forbes, *U.S. GDP grew 3.2% in the fourth quarter 2013*, 28 February 2014. Available at: <http://www.forbes.com/sites/samanthasharf/2014/01/30/u-s-gdp-grew-3-2-in-fourth-quarter-2013/>. Accessed on 20 March 2014.

\$114 billion. Many are in petrochemicals. Methanex recently started advertising jobs in a methanol plant it has dismantled and shipped from Chile to Louisiana. A second plant will start up in 2016. In October Yara, a Norwegian fertiliser manufacturer, said it will join forces with BASF of Germany to build a “world scale” ammonia plant on the Gulf Coast.

*The aluminium, iron and steel industries are also taking advantage of cheap gas supplies. Recently 19 new or expanded plants have been announced by firms including US Steel, Alcoa and ArcelorMittal. Nucor is rebuilding on a site in Louisiana, whose original plant was dismantled and shipped to Trinidad nearly a decade ago, when gas prices were rising in America. Makers of such things as cement and tyres are heavy consumers of energy, too, and thus stand to benefit from cheap gas.*⁸³⁵

8.87 One particular recent development, predicated on the availability of a steady supply of domestically-produced natural gas, was particularly striking. In April 2013 Australian fertiliser and explosives company, Incitec Pivot, announced plans to build a US\$850 million new ammonia plant in Waggaman, Louisiana, instead of in Australia. The plant, which will use US-produced natural gas as a feedstock in the production of some 800,000 metric tonnes of ammonia annually, will create in excess of 700 jobs in its construction phase, and then a further 500 permanent jobs once the plant begins operations.⁸³⁶

8.88 The Committee notes that, as of March 2014, the US government had received a total of 31 applications to allow the export of LNG produced in the US to countries with whom the US does not have a free trade agreement. Just seven of these 31 applications have been granted. These applications are processed by the US Office of Fossil Energy, in accordance with section 3 of the *Natural Gas Act of 1938* (USA) (15 U.S.C. § 717b), which states that:

no person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the [Secretary of Energy] authorizing it to do so. The [Secretary] shall issue such order upon application, unless after opportunity for hearing, [she or he] finds that

835 The Economist, *From sunset to new dawn*, 16 November 2013. Available at: <http://www.economist.com/news/business/21589870-capitalists-not-just-greens-are-now-questioning-how-significant-benefits-shale-gas-and>. Accessed on 20 March 2014.

836 Potter, Ben and Roberts, Peter, 'How Louisiana beat Newcastle to Incitec's \$940m fertiliser plant,' *Australian Financial Review*, 9 July 2013.

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*the proposed exportation or importation will not be consistent with the public interest.*⁸³⁷

8.89 On 19 March 2013 the Acting Assistant Secretary for Fossil Energy, Mr Christopher Smith, appeared before the House Committee on Oversight and Government Reform, Subcommittee on Energy Policy, Health Care and Entitlements, and explained what was meant by the ‘public interest’ criteria. According to Mr Smith:

for applications requesting authority to export LNG to countries that do not have free trade agreements requiring national treatment for trade in natural gas, DOE conducts a full public interest review. A wide range of criteria are considered as part of DOE’s public interest review process, including, inter alia,:

- *Domestic need for the natural gas proposed for export;*
- *Adequacy of domestic natural gas supply;*
- *U.S. energy security;*
- *Impact on the U.S. economy (GDP), including impact on domestic natural gas prices;*
- *International considerations; and*
- *Environmental considerations.*⁸³⁸

8.90 That is, the export of US-produced natural gas as LNG is contingent on the manner in which any such exports may impact upon the domestic market for this gas. In effect, this is in direct contrast to the situation in Australia: WA’s Reservation Policy is the only similar policy in existence in Australia. Indeed, this policy has been the subject of criticism by the federal government on numerous occasions. The federal government’s oft-repeated belief is that decisions regarding the balance between domestic supply of natural gas and exports of LNG are best made by ‘companies, not governments.’⁸³⁹

8.91 That natural gas is fundamental to the economic prosperity of this state—both through the income that it generates as a result of its export, and through its extensive use in industry—is beyond doubt. It would be extremely unfortunate to see Australian natural gas exported at the expense of the needs of the domestic market. The Committee notes that Queensland’s largest electricity producer, Stanwell Corporation, announced in February 2014 that it would stop producing electricity at one of its gas-fired generators, preferring instead to sell its contracted gas supply to a supply-constrained

837 *Natural Gas Act of 1938 (USA)* (15 U.S.C. § 717b)

838 Office of Fossil Energy, *DOE’s program regulating liquefied natural gas export applications*, 19 March 2013. Available at: <http://energy.gov/fe/articles/does-program-regulating-liquefied-natural-gas-export>. Accessed on 20 March 2014.

839 Hon Gary Gray, MP, Minister for Resources and Energy; Minister for Small Business; Minister for Tourism, Letter to Hon Bill Marmion, MLA, Minister for Mines and Petroleum, 2 August 2013.

LNG export project. As an alternative, Stanwell explained that it would resume electricity production at a coal-fired power station.⁸⁴⁰

8.92 By any measure, Australia has relatively abundant natural gas resources. Economic benefit can be derived from both the direct use and the export of these resources, and finding a balance between these two competing allocations should be of paramount importance to Australian governments. FLNG technology is only able to produce natural gas in LNG form, and as such cannot be used to produce gas for consumption in the domestic market.

8.93 As a consequence, the use of FLNG technology as a method for developing Australian gas fields will impact upon WA's domestic supply by restricting the resources available for domestic use. Though it is true that every molecule of natural gas that is exported as LNG is a molecule that cannot be used domestically, conventional onshore LNG developments have always contributed to the domestic gas supply, either via State Agreements or through the Reservation Policy. No such contribution will be made from a field developed using FLNG technology. If domestic natural gas supply is so restricted, this will have a negative impact upon domestic gas users in the form of higher prices.

8.94 As mentioned in Chapter 2, former Minister Gary Gray, MP, unilaterally decided to approve Woodside's application to vary its Browse Retention Leases and thus pave the way for the company to use FLNG as its Basis of Design (BOD). That this followed the swift environmental and development plan approval for Shell's Prelude project, seems to indicate that the federal government has embraced FLNG technology without consideration of its impacts on WA, including the supply of domestic gas for industry and households. One conclusion that could be drawn from this is that the federal government believes that nothing that could be produced in Australia using these resources would generate more value within the Australian economy than simply exporting these resources for international use. Evidence presented to the Committee strongly suggests otherwise.

Finding 55

A secure supply of domestic gas for industry is essential to the economic development of Western Australia.

Finding 56

Gas fields in Australian waters developed using FLNG technology will provide no domestic gas.

840 Macdonald-Smith, Angela, 'High prices drives Queensland power producer to sell gas,' *Australian Financial Review*, 6 February 2014, p 21.

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Finding 57

Developing Australian gas fields with FLNG technology will restrict the overall supply of gas to Western Australian industry and households.

Finding 58

A restricted supply of domestic gas will severely impact on economic development and energy demand in Western Australia.

Recommendation 24

The Western Australian Government urgently review its energy policies to reflect the existence of commercially viable FLNG technology.

Recommendation 25

The Western Australian Government continue to play an active role in energy regulation in Western Australia.

Chapter 9

The impact of FLNG on revenue to the Western Australian Government

The state government will have the major say in the next wave of development, even if it means fighting the federal government to do so.

Sir Charles Court, then Premier of Western Australia, commenting on the development of the North West Shelf project in 1976⁸⁴¹

Nobody knows...

9.1 The question of the impact on Western Australia (WA) of using FLNG to develop gas fields off the Western Australian coast has proven most difficult for the Committee to answer in any meaningful way.

9.2 As the following demonstrates, this difficulty results from a number of often inter-related factors including, but not limited to:

- the lack of publicly available information;
- competitive commercial confidentiality of companies;
- government agency reliance on company-provided information;
- inadequate or no modelling or forecasting by government agencies;
- the individual make-up of LNG projects which makes comparing onshore and offshore developments problematic;
- the dearth of local content data for the Prelude project, which is still in its relatively early stages;
- the relationship between the composition of the gas in a field, the method of extraction and the amount of gas able to be recovered from the field;
- disagreement between Woodside and government on the amount of the Torosa field's gas that is within the State's jurisdiction; and
- the lack of agreement to date between state and federal governments on the unitisation of the Browse gas reserves.

9.3 As will also be demonstrated, the Committee heard a number of general statements about the billions of dollars that FLNG would bring to the state's economy. However, there was little evidence provided to substantiate those claims or allow the Committee to assess them.

841 Warton, J, 'WA bid to tap new cash source,' *The West Australian*, 16 January 1976. Cited in Harman, Liz, 'History and politics of the North West Shelf project', *Issues in energy policy in Western Australia—discussion paper 5/83*, January 1983, p 26.

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9.4 Given the above, it has not been possible for the Committee to present accurate figures on the impact of FLNG technology on government revenue, be it local, state or federal. Therefore, rather than present an economic analysis, this chapter presents generalised information on the potential impact of FLNG on State revenue and explores some of the difficulties faced by the Committee in obtaining evidence concerning this aspect of its Inquiry. In particular, it examines the federal government's Petroleum Resource Rent Tax (PRRT), and the Western Australian royalty system and payroll tax.

9.5 The Committee acknowledges that:

- taxation and other government revenue are generated through flow-on effects from the oil and gas industry to the general business community; and
- revenue would also be generated from sources such as transfer duties on contracts and, for local governments, fees and charges, including rates.

9.6 While not dismissing the importance of these factors, this chapter is primarily concerned with the principal forms of direct revenue to government.

Types of direct revenue generated by resources

9.7 Resource companies painted a positive picture of the revenue to be generated from FLNG developments. In doing so, they outlined the principal forms of government revenue from resource development. For example, Shell's Mr Andrew Smith stated that the company's:

*expectation is that the Prelude project will pay something like \$12 billion in taxation. It will generate some \$45 billion of revenues, and we will spend around \$12 billion on Australian goods and services... These are massive sums of money that come to Australia from a resource that would not have otherwise been developed.*⁸⁴²

9.8 Similarly, Chevron's Mr Roy Krzywosinski stated that 'it is the decades of continuous operation that will generate the greatest wealth to Australia [including] tens of billions of dollars in company and income tax, state taxes and local council rates that will flow into the government coffers each year.'⁸⁴³

842 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 10. See also: Submission No. 15, Shell in Australia, 30 August, p 11.

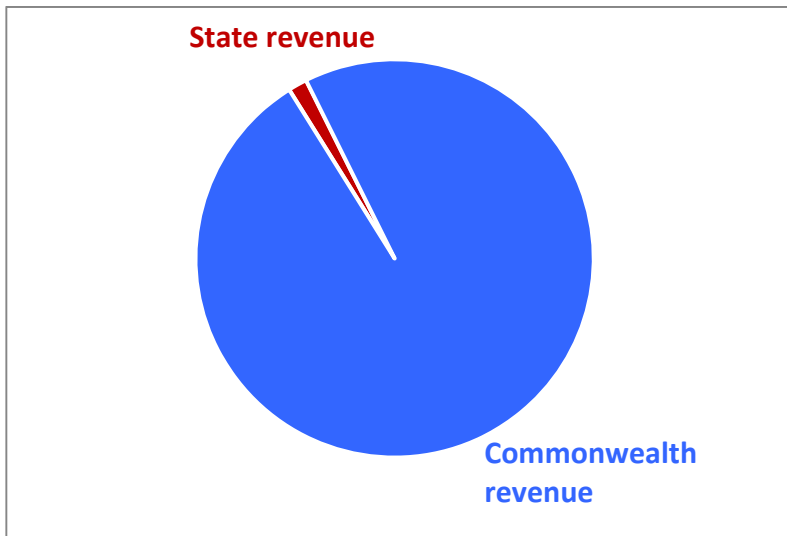
843 Mr Roy Krzywosinski, Managing Director, Chevron, *Transcript of Evidence*, 24 October 2013, p 3.

9.9 In discussing its Browse project, Woodside submitted that:

*significant revenue from the project would flow to both State and Commonwealth governments during the operations of the Browse FLNG Development. ACIL Allen estimates that State revenue from payroll tax, royalties and WA originated GST will amount to approximately A\$1.6 billion over the life of the project. Commonwealth revenue is estimated to be approximately A\$102 billion which includes PRRT, company and other taxes.*⁸⁴⁴

9.10 As these quotes demonstrate, the main generators of government revenue from resource projects are state and federal taxes, and state royalties. The breakdown of the State and Commonwealth revenues, according to Woodside's estimates, is shown in Figure 9.1. The following briefly examines the federal governments PRRT and WA's royalty regime and payroll tax system.

Figure 9.1: Woodside's Projected Commonwealth and State revenue from a Browse FLNG project



Petroleum Resource Rent Tax

9.11 The PRRT was introduced in Australia in 1987 under the *Petroleum Resources Rent Tax Assessment Act 1987* (Cth) (PRRT Act), and originally applied to all offshore areas except Bass Strait and the North West Shelf.⁸⁴⁵ In 2012 the PRRT was extended to apply

844 Submission No. 24 from Woodside Energy Ltd, 4 September 2013, p 24.

845 Department of Industry, *History of the petroleum resources rent tax*, Commonwealth of Australia. Available at:

<http://www.innovation.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/PRRTHistory.aspx>. Accessed on 17 March 2014. See also: Mayo, Wayne, *Taxing resource rent: concepts, misconceptions and practical design*, Kyscope Publishing, ACT, 2013. Australia is the only jurisdiction in the world to apply a resources rent tax. Other jurisdictions

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to onshore oil and gas projects, including oil shale projects and coal seam gas projects, and to the offshore operations of the North West Shelf.⁸⁴⁶ The objective of this amendment was to deliver ‘a fairer return to the Australian community from the extraction of its non-renewable resources.’⁸⁴⁷

9.12 The PRRT was extended to onshore oil and gas across Australia at the same time as the Mining Resource Rent Tax was introduced. On 24 October 2013, the new coalition federal government released an Exposure Draft of the *Minerals Resource Rent Tax Repeal and Other Measures Bill 2013* (Cth). The Committee notes that this Repeal Bill will not affect the extension of the PRRT, which will remain in place in WA.⁸⁴⁸

9.13 PRRT applies to the sale of petroleum products known as ‘marketable petroleum commodities.’ A marketable petroleum commodity is one that is produced from petroleum for the purpose of being sold or used as feedstock or for direct consumption as energy.⁸⁴⁹ These products are listed in the PRRT Act as:

- stabilised crude oil;
- sales gas;
- condensate;
- liquefied petroleum gas (LPG);
- ethane;
- shale oil; and
- any other product specified as such in the regulations.⁸⁵⁰

9.14 Under section 2E of the PRRT Act, a commodity produced wholly or partly from a marketable petroleum commodity cannot itself be a marketable petroleum commodity.

9.15 While PRRT is a complex taxation arrangement, it is basically a profits-based tax applied to each project. A petroleum project exists when there is an existing production licence. From July 2012, in certain circumstances Exploration Permits and Retention Leases can qualify as a petroleum project for PRRT purposes.⁸⁵¹

9.16 The July 2012 changes to the PRRT legislation also amended the provisions relating to the combining of projects for PRRT purposes. The Resources Minister’s authority to

generally tax resource projects through an accounting tax which, in effect, increases the rate of company tax.

846 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

847 *ibid.*

848 Herbert Smith Freehills, *Proposed repeal of the Minerals Resource Rent Tax*, 11 November 2013. Available at: <http://www.herbertsmithfreehills.com/insights/legal-briefings/proposed-repeal-of-the-minerals-resource-rent-tax>. Accessed on 1 May 2014.

849 Section 2E, *Petroleum Resource Rent Tax 1987* (Cth).

850 *ibid.*

851 Ernst & Young, ‘Petroleum Resource Rent Tax. What are the decisions you need to make and your obligations ahead?’, *Tax Insight*, March 2012, p 2.

combine petroleum projects into a single project in certain circumstances was extended to onshore projects. The minister must ‘determine whether the projects are sufficiently related to be treated as a single petroleum project.’⁸⁵² For example, ‘for onshore projects, the degree of downstream common processing and treatment of petroleum is considered.’⁸⁵³

9.17 Furthermore, while the original PRRT legislation did not provide for a consolidation regime, following the July 2012 amendments, ‘consolidated income tax groups can choose to consolidate for PRRT purposes, however only in relation to the PRRT taxation [sic] of onshore projects.’⁸⁵⁴

9.18 PRRT, in essence, taxes the above normal profits or ‘resource rents’ of a project and is levied at the rate of 40 per cent. The Department of Mines and Petroleum (DMP) describes the PRRT as a ‘secondary tax based on a project’s profitability, and applies to all petroleum products from a project (i.e. crude oil, natural gas and LPG condensate, but not value added products, such as LNG).’⁸⁵⁵ In effect, PRRT is a cash flow sharing arrangement, with government and resource companies sharing equally and immediately in negative and positive cash flow generated by projects.⁸⁵⁶ That said, when a company subject to PRRT experiences a negative cash flow, the government does not have a direct liability; rather, a credit is given against future secondary taxes.⁸⁵⁷

9.19 The PRRT is structured so that exploration expenditure not deducted in the incurring tax year is carried forward to subsequent years. Furthermore, all project expenditure and PRRT payments are tax deductible for company tax purposes. As DMP submitted, ‘all State and Commonwealth resource taxes will be creditable against current and future PRRT liabilities from a project.’⁸⁵⁸

9.20 During the Inquiry, concern was expressed as to whether expenses such as FLNG research and development, solving any FLNG teething problems, and company sponsorship of Chairs at universities, for example, could be off-set against a project’s PRRT liability.

9.21 In addressing this issue, Shell stated that its Prelude project ‘is no different to any other oil and gas development in... Commonwealth waters. It is subject to all the same tax

852 *ibid*, p 2 and p 6.

853 *ibid*

854 *ibid*, p 2 and p 7.

855 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

856 Department of Industry (Cth), *Petroleum Resource Rent Tax*. Available at:

<http://www.innovation.gov.au/resource/Enhancing/ResourcesTaxation/PetroleumResourceRentTax/Pages/default.aspx>. Accessed on 4 April 2014.

857 Mayo, Wayne, *Taxing resource rent*, Kyscope Publishing, Victoria, 2013, p 136.

858 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

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legislation and operates in exactly the same way.’⁸⁵⁹ According to Shell’s Mr Stephen Phimister, ‘the legislation tells us what direct costs associated with that project are eligible for depreciation reduction, and that is exactly how it will be done. It will be very similar, if not identical, to the treatment of other commonwealth developments.’⁸⁶⁰

9.22 The Committee understands that research and development costs associated with developing a new technology such as FLNG would not be creditable against PRRT as the tax applies only to resource rent.⁸⁶¹ Furthermore, only research and development expenditure incurred in Australia during the operational phase of an FLNG project to resolve operational issues is creditable against PRRT. For example, Shells’ research in The Netherlands would not be creditable against its PRRT liability for Prelude.⁸⁶²

9.23 FLNG projects represent a major benefit to the federal government. The lack of any onshore development means a much lower capital expenditure for the project. This results in higher profits, and, therefore, higher taxes, produced more quickly. As Dr Mike Nahan, MLA, Minister for Energy, advised, ‘the commonwealth—the taxing agent, the government—is pleased because they get the revenue quicker because the cost is lower and you do not spend years building an onsite plant.’⁸⁶³

9.24 Dr Nahan’s view is supported by the decision of the former Commonwealth Minister for Resources and Energy, Hon Gary Gray, MP, to approve Woodside’s amendment to its Browse leases. In explaining his decision to the WA Minister, Mr Gray advised that he was ‘committed to the early and successful commercialisation of the Browse resources.’⁸⁶⁴

9.25 The Department of State Development (DSD) argued that while FLNG facilities would take longer to fully exploit a reserve and yield smaller annual royalties, ‘if projects are quicker to bring gas to production, then there could be benefits through earlier realisation of royalty revenues.’⁸⁶⁵

9.26 The amount of a resource company’s PRRT liability necessarily depends on the amount of gas sold. This, in turn, depends on the amount of gas extracted from a field. Concerns have been raised in relation to the potential for large amounts of gas to be

859 Mr Stephen Phimister, General Manager, Shell Australia, *Transcript of Briefing*, 26 June 2013, p 12.

860 *ibid*.

861 Mr Bill Layer, former Resource Taxation Manager, Commonwealth Department of Resources, 15 January 2014.

862 *ibid*.

863 Dr Mike Nahan, MLA, Minister for Energy, Government of Western Australia, *Transcript of Closed Evidence*, 5 December 2013, p 4.

864 Hon Gary Gray, MP Minister for Resources and Energy, Letter (dated 27 June 2013) to Hon Bill Marmion, Minister for Mines and Petroleum. See Appendix Twelve.

865 Submission No. 27, Department of State Development, 2 October 2013, p 5.

left in fields following extraction using FLNG technology. This is discussed further below.

- 9.27 Where a field is situated in both federal and state waters, while there is no legal or policy requirement to do so, governments can negotiate a unitisation agreement to share PRRT revenue from that field. The Torosa field in the Browse Basin is an example of such a situation. Unitisation of petroleum resources is also discussed further below.
- 9.28 The Committee believes that the Commonwealth should re-examine the way PRRT is structured with the development of FLNG and the ability to claim a tax deduction against the entire fully-built FLNG unit.

Finding 59

The Petroleum Resource Rent Tax was designed and implemented prior to the development of FLNG technology.

Recommendation 26

The Western Australian Government urge the Commonwealth Government to re-examine the tax treatment of the development costs of FLNG and the valuation of the vessel.

Western Australian Government royalties

- 9.29 As noted in the introduction to this report, oil and gas resources in Australia are owned by the Crown and held in trust for the Australian community. As the DMP notes, 'when title to these nonrenewable resources is transferred to developers, the State expects a return to the community.'⁸⁶⁶ The return to the community takes the form of as royalty, which is compensation 'paid to the State for the use and loss of an asset.'⁸⁶⁷
- 9.30 The state government collects royalties from onshore projects, while both the state and federal governments receive royalties from offshore projects in their respective territorial waters and in line with relevant legislation and agreements.⁸⁶⁸
- 9.31 There are two exceptions to this. First, the federal and state governments share royalties from the Barrow Island project, which is an onshore Western Australian project. Second, while the North West Shelf project is not in Western Australian waters, WA receives royalties from this project in the form of a grant from the Commonwealth.⁸⁶⁹

866 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

867 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 6.

868 Department of Mines and petroleum, *Royalty and financial considerations*. Available at: <http://www.dmp.wa.gov.au/1940.aspx>. Accessed on 18 March 2014.

869 Department of Mines and petroleum, *Royalty and financial considerations*. Available at: <http://www.dmp.wa.gov.au/1940.aspx>. Accessed on 18 March 2014.

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- 9.32 Royalties take the form of either a wellhead royalty or a resource rent royalty. New petroleum projects 'landward of the outer limit of the Territorial Sea' are subject to the wellhead royalty regime.⁸⁷⁰ The wellhead royalty rate 'is normally set at between 10–12.5% of the wellhead value of petroleum produced.'⁸⁷¹
- 9.33 According to the Western Australian Government's submission to the 2011 review of GST distribution, WA's 'royalty regime is considered to strike a reasonable balance between the often competing objectives of maximising economic efficiency, fairness, simplicity, and relative stability and predictability of revenue streams.'⁸⁷²
- 9.34 The WA Department of Treasury's (Treasury's) *2012–2012 Budget Papers'* Economic Outlook acknowledges the 'robust economic growth' in WA was 'being underpinned by high levels of resource investment, particularly from major offshore LNG projects such as the \$30.0 billion Gorgon and \$29.0 billion Wheatstone projects.'⁸⁷³ This strong economic growth was not expected to result in increased revenue growth 'as much of the economic activity is outside the State Government's tax base. Western Australia receives limited revenue benefits from [petroleum] resource-driven investment growth, particularly LNG projects.'⁸⁷⁴ According to Treasury, WA 'receives limited revenue benefits during the construction of major resource projects and, once operational, the revenue from massive LNG projects such as Pluto, Gorgon and Wheatstone will be collected by the Commonwealth Government' through PRRT.⁸⁷⁵
- 9.35 The 2012–2013 State Budget showed estimated actual petroleum royalties of \$20.2 million for 2011–2012, not including the North West Shelf. At that time, Treasury estimated petroleum royalties would fall to \$12.9 million for 2012–2013 and 2013–2014, a sharp decline of 36.1 per cent.⁸⁷⁶
- 9.36 The actual petroleum royalties, excluding the North West Shelf, for 2011–2012 were \$18 million, while the 2012–2013 estimated actual was \$16.6 million. Forward

870 Department of Mines and petroleum, *Royalty and financial considerations*. Available at: <http://www.dmp.wa.gov.au/1945.aspx>. Accessed on 18 March 2014.

871 Submission No. 13 from BP, 30 August 2013, p 3. See also: Department of Mines and petroleum, *Royalty and financial considerations*. Available at: <http://www.dmp.wa.gov.au/1943.aspx>. Accessed on 18 March 2014; and Department of Treasury and Finance, *Analysis of the Commonwealth Government's proposed resource rent tax regime, November 2010*, pp 5–6.

872 Government of Western Australia, *GST distribution review WA submission*, October 2011, p 7.

873 Department of Treasury, *Budget papers 2012–13*, Vol 2, No 1, Government of Western Australia, Perth, 2012, p 301.

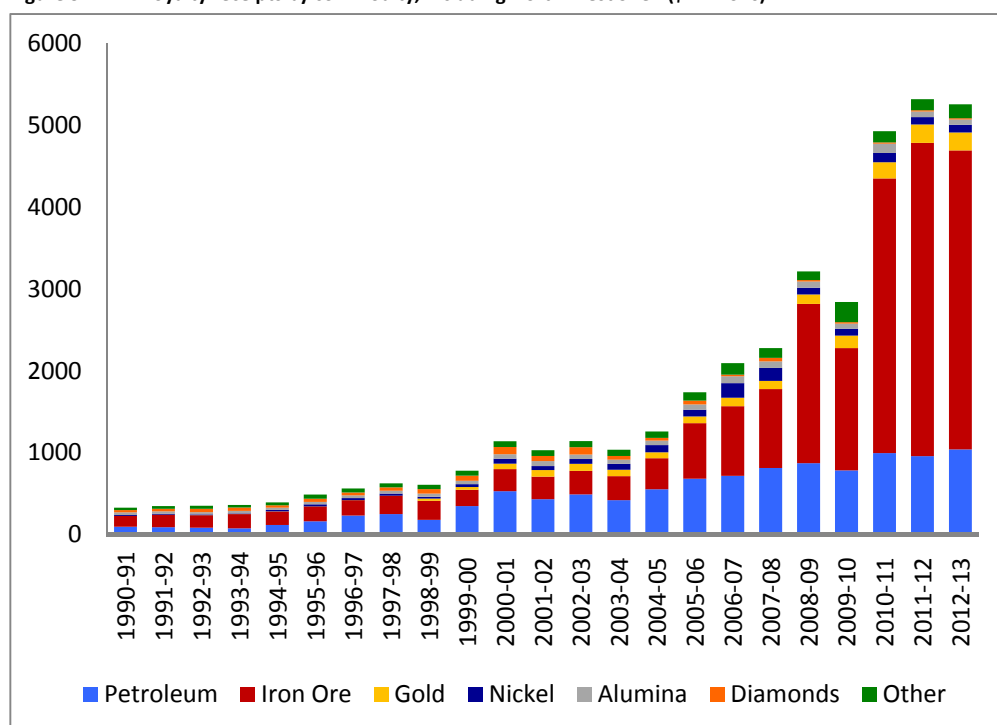
874 *ibid*.

875 Department of Treasury, *Budget papers 2012–13*, Vol 3, Government of Western Australia, Perth, 2012, p 2. Note: the state government would receive considerable revenue in the form of payroll tax from resource projects.

876 Department of Treasury, *Budget papers 2012–13*, Vol 2, No 1, Government of Western Australia, Perth, 2012, p 177.

estimates for the three years to 2016–2017 are \$11.7 million, \$12.9 million and \$13.7 million respectively.⁸⁷⁷

Figure 9.2: WA royalty receipts by commodity, including North West Shelf (\$ millions)⁸⁷⁸



9.37 WA's royalty regime is currently being reviewed in consultation with industry. Treasury argues that this analysis is neither designed nor intended to 'pursue any thorough going change of all relevant royalty rates to actual royalty rates.'⁸⁷⁹ Instead, it is 'designed over time to achieve a marginally improved revenue return to the Western Australian community from the sale of the mineral products that the community owns.'⁸⁸⁰

9.38 In relation to the North West Shelf, while DMP negotiates and assesses royalties for that project, because it is in Commonwealth waters, the Commonwealth Government

877 Department of Treasury, *Budget papers 2013–14*, No. 2, Vol 2, Government of Western Australia, Perth, 2013, p 672.

878 Source data obtained from the Department of Mines and Petroleum, *Royalty receipts and North West Shelf grants 2012 and 2013*. Available at: <http://www.dmp.wa.gov.au/1521.aspx>. Accessed on 2 April 2014.

879 Department of Treasury, *Budget papers 2012–13*, Vol 3, Government of Western Australia, Perth, 2012, p 9.

880 Department of Treasury, *Budget papers 2012–2013*, Vol 3, Government of Western Australia, Perth, 2012, p 9. The target for royalty revenue is 10 per cent of the total 'mine head' value, and the actual royalty rates to achieve that are considered by Treasury to be unachievable.

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collects the North West Shelf royalties.⁸⁸¹ Under a revenue sharing arrangement in accordance with s 75 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGGS Act), the Commonwealth retains approximately one third of the North West Shelf royalty payments and WA receives two thirds as a Commonwealth Grant.⁸⁸²

9.39 A 2009 ACIL Tasman report stated that the North West Shelf Project's annual royalty payments were then more than \$1.2 billion per annum.⁸⁸³ Assuming that WA would receive two thirds as a Commonwealth Grant, this equated to \$800 million per annum state revenue. This data only included trains 1, 2 and 3.

9.40 In June 2011, DMP estimated the Commonwealth Grants payments for the North West Shelf would be as follows:

- 2010–2011 \$898 million
- 2011–2012 \$1,028 million
- 2012–2013 \$1,099 million
- 2013–2014 \$1,193 million⁸⁸⁴

9.41 As DMP's information demonstrates, particularly when read in conjunction with the information provided in Figure 9.1, North West Shelf royalties provide a significant and reliable source of revenue for WA. If WA is to continue to provide infrastructure to support offshore resource developments in the north west, it is essential that this revenue stream continues.

9.42 The *Barrow Island Royalty Variation Agreement Act 1985* (WA) established an agreement between the producer and the state and Commonwealth Governments that replaced the wellhead royalty system that had applied to Barrow Island as a project in state jurisdiction with a resource rent royalty. This royalty was based on a percentage of net cash flow and set at a rate of 40 per cent of income in excess of a threshold rate.⁸⁸⁵

881 Department of Mines and Petroleum, *Submission to Standing Committee on Agriculture, Resources, Fisheries and Forestry inquiry into the Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Bill 2011 and associated Amendment Bills*, 10 June 2011, p 4.

882 Commonwealth of Australia, *2013–2014 Budget paper no. 3, part 3, general revenue assistance*, 2013. Available at: http://www.budget.gov.au/2013-14/content/bp3/html/bp3_04_part_3.htm. Accessed on 20 March 2013.

883 ACIL Tasman, *Nation builder. How the North West Shelf Project has driven economic transformation in Australia*, ACIL Tasman Pty Ltd, Melbourne, October 2009, p vii.

884 Department of Mines and Petroleum, *Submission to Standing Committee on Agriculture, Resources, Fisheries and Forestry inquiry into the Offshore Petroleum and Greenhouse Gas Storage Amendment (National Regulator) Bill 2011 and associated Amendment Bills*, 10 June 2011, p 5.

885 Section 6(2)(4) Schedule—*Barrow Island Royalty Variation Agreement, Barrow Island Royalty Variation Agreement Act 1985* (WA).

9.43 The state receives 25 per cent of the resource rent royalty, with the remaining 75 per cent going to the Commonwealth. By agreement, WA is responsible for the administration of the resource rent royalty regime.⁸⁸⁶

9.44 The impact of FLNG technology on the State's revenue is not clear. This is discussed further below. At this point, though, it is important to note that the amount of the impact depends on three main factors, namely, the amount of gas in the state areas of the Torosa field, the unitisation arrangements made between the state and federal governments, and the characteristics of the gas, that is, whether it is wet or dry gas.

Browse gas reserves in Western Australia's jurisdiction

9.45 Woodside has provided several different estimates of the proportion of Torosa field gas initially-in-place (liP) in WA's jurisdiction. These are provided in Table 9.1.

Table 9.1: Woodside's estimates of gas initially-in-place for the Torosa field⁸⁸⁷

Year	Gas (liP, tcf)	WA share (tcf)	WA share (per cent)
2003	22	7.1	32.1
2008	22.4	not reported	not reported
2010	20.66	not reported	not reported
2011	17.6	not reported	not reported
2013	24.3	2.6	10.7

9.46 DMP advised that the gas liP data was provided by Woodside 'without technical justification.'⁸⁸⁸

9.47 DMP's studies, 'based on sound engineering and geoscientific principles' indicate approximately 7 trillion cubic feet (tcf) of Torosa gas liP resides in WA's jurisdiction and 16 per cent of Woodside's Browse Basin gas resides in areas covered by State Retention Leases.⁸⁸⁹ DMP advised that while the Department has 'not wavered' from its estimate, Woodside is developing 'yet another plan.'⁸⁹⁰ Mr Haworth of DMP stated that the Department was:

886 Department of Mines and petroleum, *Royalty and financial considerations*. Available at: <http://www.dmp.wa.gov.au/1947.aspx>. Accessed on 18 March 2014.

887 Based on Department of Mines and Petroleum data. See: Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 8.

888 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 9.

889 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 8.

890 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 5.

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*still pursuing Woodside to get a firmer position on that and we are also communicating with the commonwealth and the Department of Industry. I am planning on going over there in early March and part of the meeting over there will be to talk about how much is actually in Western Australia, and come to a landing on that.*⁸⁹¹

9.48 While the Committee accepts that gas reserves estimates may vary as more is learned about a field, the current situation in relation to the Torosa field is unacceptable. It is essential that DMP provide a technically robust estimate of the WA area of the Torosa reserve as a matter of urgency, particularly as the current lease agreement expires on 24 December 2014.

Finding 60

Western Australia has a direct interest in the Browse gas resources through its ownership of a portion of the Torosa gas field.

Finding 61

There is a lack of agreement between the Department of Mines and Petroleum, the Commonwealth Government and Woodside Energy in relation to the proportion of the Torosa field resources that resides in Western Australian waters.

Finding 62

The Department of Mines and Petroleum is yet to define the Western Australian share of the Torosa gas field with Woodside Energy.

Recommendation 27

The Department of Mines and Petroleum provide their minister with a technically robust assessment of the proportion of the Torosa field resources that reside in Western Australian waters.

Unitisation

9.49 The defined areas of geo-political jurisdictions are artificial and not created by natural boundaries. Mineral resources, including petroleum, occupy geologic structures or areas, which can straddle geo-political areas. That is, oil and gas owned by different parties may occupy a common reservoir. Unless there is cooperation between licence holders of such reserves, field development is likely to be competitive, inefficient and wasteful, particularly where the Common law rule of capture applies.⁸⁹² Under the rule of capture, the petroleum belongs to the landowner who extracts it from a well on

891 *ibid.*

892 Rush, Sean, 'Unitisation and redetermination: Winning the end game' Memery Bank, MemeryCrystal, May 2010, p 1.

his/her land regardless of whether the petroleum has migrated from adjacent properties.

9.50 One cooperative mechanism designed to achieve maximum recovery of petroleum resources through collective development is called 'unitisation,' with unitisation agreements between owners setting out how the deposit will be developed and how the proceeds will be shared. Unitisation agreements for deposits extending beyond country boundaries are generally achieved via treaties between the countries, with subsequent International Unitisation Agreements (IUAs) developed between the respective developers.⁸⁹³

9.51 An example of an IUA is the Greater Sunrise Unitisation Agreement, which was signed by Australia and the Democratic Republic of Timor-Leste (East Timor) on 6 March 2003 and provides for the development of the Sunrise and Troubadour gas and condensate fields in the Timor Sea.⁸⁹⁴ Developing an IUA was a condition of the Timor Sea Treaty of 2002 between Australia and Timor-Leste which created a Joint Petroleum Development Area for the joint management of designated petroleum areas. This Treaty provided that:

*Australia and East Timor agree to unitise the Sunrise and Troubadour deposits (collectively known as 'Greater Sunrise') on the basis that 20.1% of Greater Sunrise lies within the JPDA. Production from Greater Sunrise shall be distributed on the basis that 20.1% is attributed to the JPDA and 79.9% is attributed to Australia.*⁸⁹⁵

9.52 A 2006 Treaty modified the 2002 Treaty, with one modification being the equal sharing of upstream revenue from the unitised field. Article 5 of that Treaty provides that 'the Parties shall share equally revenue derived directly from the production of that petroleum lying within the Unit Area in so far as the revenue relates to the upstream exploitation of that petroleum.'⁸⁹⁶

893 Explanatory Memorandum, *Greater Sunrise Unitisation Agreement Implementation Bill 2004*. Where the petroleum deposit is in a disputed area but the countries have a common aim to develop the resource, a Joint Development Zone may be established.

894 Explanatory Memorandum, *Greater Sunrise Unitisation Agreement Implementation Bill 2004*; and Woodside, 'Sunrise LNG.' Available at: <http://www.woodside.com.au/our-business/sunrise/Pages/default.aspx>. Accessed on 17 March 2014. The Timor Gap Treaty of 1989 between Australia and Indonesia was not recognised by Timor-Leste.

895 *Greater Sunrise Unitisation Agreement Implementation Bill 2004*, Bills Digest No. 108 2003-04, Department of Library Services, Commonwealth of Australia, 2004, p 2.

896 Article 5, Treaty between Australia and the Democratic Republic of Timor-Leste on Certain Maritime Arrangements in the Timor Sea, January 2006. In 2013 Timor-Leste referred a dispute with Australia in relation to this treaty to international arbitration.

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- 9.53 In relation to the unitisation of fields such as Browse that are divided between Commonwealth and state waters, DSD stated that:

*an ad hoc scheme for the distribution of royalties revenues between the Commonwealth and State would apply. This would depend on a unitisation agreement based on how much gas is in State water and how much is in Commonwealth water. A revenue share agreement based on Commonwealth collection of the PRRT over all fields (in Commonwealth and State waters) would require the State to reach agreement over royalties with the Commonwealth.*⁸⁹⁷

Unitisation of the Torosa field

- 9.54 As mentioned previously, gas in the Torosa field straddles state and federal areas, with Woodside and its Joint Venture partners holding the Commonwealth and State leases for this field. In general terms, estimates of recoverable gas are used as the basis for unitisation negotiations or sharing of revenues.⁸⁹⁸
- 9.55 In turn, recoverable gas proportions are dependent on the development plan for the field. According to DMP:

*this is a particular issue for Torosa, where access for drilling production wells may be limited by the reef and due to thinning of the gas reservoir towards the north, which may limit the commerciality of drilling additional wells.*⁸⁹⁹

PRRT v royalties

- 9.56 There is an inherent tension between the federal PRRT and the state's royalty regime. As the following demonstrates, one taxes profits, the other production.
- 9.57 As a form of cash flow taxation, the federal government's receipt of PRRT for a particular project is dependent upon a number of factors including the speed with which that project is developed, the time it takes for that project to become profitable, and the profitability of the project.
- 9.58 As noted above, the sale of petroleum resources, which are relatively scarce and non-renewable, generates 'resource rents' or above normal profits.⁹⁰⁰ The PRRT was designed to tax these profits with 'as little impact as practicable on investment decisions in the [petroleum resource] sector.'⁹⁰¹ In a very broad sense, the PRRT seeks

897 Submission No. 27, Department of State Development, 2 October 2013, p 5.

898 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 9.

899 *ibid.*

900 Mayo, Wayne, *Taxing Resource Rent*, Kyscope Publishing, 2013, p xvii.

901 *ibid.*, p 125.

to do this by including the federal government as a petroleum industry partner, sharing in both the risk and reward of Australian petroleum production. The federal government only receives PRRT payments when a particular petroleum project is profitable. The 2012 imposition of the broadly similar Minerals Resource Rent Tax demonstrates that cash flow taxation is, at the federal level, the preferred method of compensating Australians for the sale of their non-renewable resources.⁹⁰²

9.59 By contrast, to compensate for the sale of Western Australian-owned mineral resources a royalty is levied on resource production. In the case of petroleum resources, royalties are levied on the production of state-owned resources (production that occurs either onshore or within coastal waters) and on the North West Shelf project. As noted, the royalty rate is normally set at between 10 and 12.5 per cent of the wellhead value of petroleum produced.⁹⁰³

9.60 Royalty payments and PRRT function in very different ways. This gives rise to a tension between their operations, particularly as the marginal cost of producing a particular petroleum resource will increase as the field is depleted (see further discussion below). Where taxation is collected by way of royalty payments, the taxation collected for each molecule of gas is the same, regardless of how easy or difficult it is to extract. That is, by imposing a royalty regime, the state government has a clear incentive to ensure that a project proponent extracts every last molecule of natural gas from a field that is under production, regardless of how expensive it may be for the proponent. In this way, the state government ensures that resources are fully produced without compromising the revenue that it receives.

9.61 Under a PRRT, however, taxation receipts will cease once a project is no longer commercially viable, as defined by the petroleum company, and production is discontinued. Under a PRRT, the federal government similarly has no incentive to see that resource produced—in fact, continued production of an unprofitable resource will come at the federal government's expense. The PRRT, then, gives an incentive to both project proponents and government to abandon a project before the resource has been fully produced. This is not the best possible outcome for Western Australia.

9.62 The portability and lower fixed cost of FLNG technology will likely mean that a field will be abandoned earlier than would be the case using onshore gas process. Arguments to this effect were made with respect to the use of floating production storage and offloading (FPSO) vessels in the production of liquid hydrocarbons dating back to the

902 Australian Tax Office, *Mineral Resource Tax—MRRT concepts*. Available at: <http://www.ato.gov.au/Business/Minerals-resource-rent-tax/MRRT-concepts/>. Accessed on 24 March 2014.

903 Department of Mines and Petroleum, *Petroleum Royalties*. Available at: <http://www.dmp.wa.gov.au/1943.aspx>. Accessed on 24 March 2014.

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1990s. FPSOs are now widely used in producing Australian petroleum resources.⁹⁰⁴ The Committee also notes that when the Griffin FPSO, which was used to produce oil from the Griffin oil field off the coast of Western Australia, ceased production in October 2009, some 10 million barrels of oil were left unproduced in the field.⁹⁰⁵

9.63 DMP have signalled a preference for WA's revenue from the Woodside's Browse project to be based on production royalties and not 'on an arrangement to share PRRT over the whole project.'⁹⁰⁶ While royalties would be of immediate benefit to WA once production commences, there is no modelling to support this position.

Recommendation 28

In the event that a single project proponent develops the seven Browse Retention Leases, the Western Australian Government negotiate a unitisation agreement with the Commonwealth Government.

Recovery of gas and condensate using FLNG technology

9.64 While the amount of gas in a field is important, perhaps of greatest significance is the amount that is eventually extracted from the field. There is concern that the use of FLNG technology will result in more gas being left in the field that would typically be the case where onshore processing is used or with conventional offshore facilities. There are two main reasons for this concern. One is the impact of increased operating costs associated with FLNG; the other is the impact of the characteristics of the gas on what can be recovered.

9.65 While FLNG offers lower capital expenditure, it will require greater operating expenditure. Drawing on the experience of FPSOs, DMP suggested that this lower capital, high operating situation means that an FLNG development could be 'abandon[ed] or cease production at an earlier time' than an onshore or fixed facility.⁹⁰⁷ The result is that some of the gas will be left in the ground. DMP also cited BHP's experience with the Griffin oil field, which was deemed not viable to continue even though 10 million barrels of oil remained in the ground. A similar scenario is a concerning prospect for fields developed using FLNG technology.

904 MacGillivray, Ian, 'Development in Regulation of FPSOs in Australian waters,' Paper presented at the 13th Annual FPSO Congress, Singapore, 2012. Presentation slides available at: <http://www.nopsema.gov.au/assets/Presentations/Presentation-Sept-2012-Development-in-Regulation-of-FPSOs-in-AUSTRALIAN-WATERS.pdf>. Accessed on 24 March 2014.

905 Mr William Tinapple, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Briefing*, 19 June 2013, p 7. See also: INPEX Corporation 'The cessation of production at the Griffin oil fields, offshore Western Australia,' Media Release, 29 October 2009. Available at: <http://www.inpex.co.jp/english/news/pdf/2009/e20091026-b.pdf>. Accessed on 24 March 2014.

906 Submission No. 18 from Department of Mines and Petroleum, 30 August 2013, p 7.

907 Mr William Tinapple, Executive Director, Petroleum, Department of Mines and Petroleum, *Transcript of Briefing*, 19 June 2013, p 7.

- 9.66 Shell, however, argues that capital and operating expenditure ‘balance[s] each other out. According to Mr Andrew Smith, ‘a 30 per cent difference of tens of billions of dollars is such a large difference in the capex cost that it more than offsets small differences in operating costs over the life of a project.’⁹⁰⁸
- 9.67 In analysing the impact of FLNG technology on revenue, it is important to consider the reservoir characteristics, particularly whether the gas is dry or wet, that is, its level of condensate, and the production capacity per well. This means that any such analysis must be completed on a field-by-field basis.
- 9.68 Put very simply, condensate is extracted under pressure. While dry gas is relatively straight forward, gas that is rich in condensate (wet gas) presents particular challenges around pressure maintenance to ensure that as much gas as possible is retrieved. As such a ‘field gets depleted the pressure can drop to a point which goes below the dew point of condensate.’⁹⁰⁹ This means that some of the condensate will turn from gas to liquid and ‘coat the source rock.’⁹¹⁰ This ‘dropping out’ of condensate means that it is not able to be extracted; it is, in fact, irrecoverable, a lost resource.⁹¹¹ Pressure loss problems can be alleviated by the use of injections wells which are used to inject either water or gas to maintain pressure at an appropriate level to keep condensate in its gaseous form.⁹¹²
- 9.69 Companies wanting to develop their Retention Leases must prepare a final field development plan which outlines the way in which the field will be developed. This plan is signed off by the state and federal governments and the resource company.⁹¹³ Where companies want to process gas and condensate at the same time ‘there is a real potential for Western Australia and Australia to lose revenue in royalties in the sales of those condensates.’⁹¹⁴
- 9.70 Shell’s Prelude and Woodside’s Torosa field in the Browse Basin provide useful examples of condensate-rich fields. It is not clear what field compression equipment could be, if necessary installed on an FLNG vessel and how that might compare to that

908 Mr Andrew Smith, Country Chair, Shell in Australia, *Transcript of Evidence*, 23 October 2013, p 14.

909 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 5.

910 Mr Richard Sellers, Director General, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 2.

911 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 5; and Mr Richard Sellers, Director General, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 2.

912 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 4.

913 *ibid*, p 5.

914 Mr Richard Sellers, Director General, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 2.

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used on offshore platforms such as Wheatstone. The Committee notes that the North Rankin 2 project, through providing ‘additional compression to retrieve low pressure reserves from [the North Rankin and Perseus] fields’ extended the life of these fields to 2040.⁹¹⁵

9.71 It is also not clear how the installation of compression equipment would impact on the productive capacity of an FLNG vessel.

9.72 In discussing Woodside’s current proposal for extraction of the Torosa field gas, DMP advised that pressure maintenance was an issue the Department was discussing with Woodside and the federal government. As Mr Jeff Haworth, Executive Director Petroleum, explained:

*as this field gets depleted the pressure can drop to a point which goes below the dew point of condensate, which means that the condensate will drop out. Should it drop out it is irrecoverable. To us, from our estimations, that could be as significant as a \$1.1 billion loss to state revenue.*⁹¹⁶

9.73 Shell’s responses to questions from the Committee indicate that its FLNG units could, if required, accommodate field compression equipment, including gas recycling and depletion compressor facilities. However, Shell’s responses also indicated that such equipment would only be installed when it is commercially viable to do so. Shell also stated that gas recycling and LNG production would occur sequentially, which given Shell’s view and the resulting delay in LNG production, would mean that it would be highly unlikely that gas recycling would ever be commercially viable. However, there are cases where gas recycling and LNG production has occurred simultaneously. The Bayu-Undan Field development incorporated gas recycling two years prior to LNG production and this continued following LNG production.⁹¹⁷ Whether or not gas recycling is commercially viable depends on several factors including reservoir characteristics including gas/condensate composition, facilities costs and economics of production.

9.74 While shipyard construction of FLNG facilities has advantages, particularly construction in a controlled environment, the all-in facilities nature of FLNG which are designed for a particular field limits the flexibility of development options. It would be economically

915 Offshore Technology Market and Customer Insight, *North Rankin Redevelopment Project, Indian Ocean, Australia*. Available at: <http://www.offshore-technology.com/projects/north-rankin-redevelopment-australia/>. Accessed on 20 March 2013.

916 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 4.

917 ConocoPhillips Australia, *Our business activities. Our projects. Bayu-Undan*. Available at: <http://www.conocophillips.com.au/our-business-activities/our-projects/Pages/bayu-undan.aspx>. Accessed on 10 April 2014.

disastrous for LNG production to be deferred to allow sequential gas recycling or, for example, if a reservoir management issue arises during development drilling which would affect resource recovery.

- 9.75 It is the Committee's view that, as a condition of the production licence, project proponents utilising FLNG technology, and particularly for Browse resources, should demonstrate that the technology will optimise resource recovery. The method of extraction which is approved in the production licence for Torosa has the potential to significantly impact on the amount of gas and condensate recoverable from the field and, in turn, the amount of revenue returned to the State.

Finding 63

While FLNG units can accommodate field compression equipment, optimum resource recovery is not guaranteed. The absence of compression equipment on FLNG vessels in fields where condensate is present could significantly diminish Commonwealth and state revenue.

Recommendation 29

The Western Australian Minister for Resources advocate the installation of compression equipment as part of the field development plans during the appraisal by the Joint Authority where appropriate. This would oblige project proponents proposing to utilise FLNG technology, and in particular for Browse resources, to demonstrate in their project proposals and field development plan that the technology will optimise resource recovery.

Payroll tax

- 9.76 Payroll tax is levied on employers or groups that pay wages over \$62,500 in any month. The tax is applied at the rate of 5.5 per cent and is assessed on the gross salary or wages paid, including employee entitlements and payroll deductions made on their behalf.⁹¹⁸
- 9.77 The Office of State Revenue provided the Committee with data on payroll tax paid by companies classified as Oil and Gas Extraction, and as Petroleum Exploration for the 2012–2013 financial year and year-to-date 2013–2014 (as at 28 March 2014). This information is provided in Table 9.2.
- 9.78 This data needs to be read with the following in mind. First, the industry classifications are comprised of the various business industry codes used by the Australian Taxation Office. Oil and gas extraction includes natural gas extraction, oil shale mining and petroleum gas extraction. Petroleum exploration includes gas and petroleum

918 Office of State Revenue, Department of Finance, *Payroll tax. General information*, Government of Western Australia, Perth, 1 July 2012, pp 1–2.

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exploration. Second, industry codes with payroll tax payments of less than \$1 million are not included. Third, businesses self-identify their particular industry code and self-assess their payroll tax liability. Therefore, the amounts in Table 9.2 need to be read as approximations.⁹¹⁹ Nevertheless, they provide a good indication of the value of payroll tax received by the Western Australian Government from the petroleum exploration and extraction industry, with \$40 million received for 2012–2013 and \$26 million received to date for the 2013–2014 financial year.

Table 9.2: Payroll tax received by the Western Australian Government for selected industry classifications⁹²⁰

Industry Classification	2012–2013	Year-to-date 2014 (28 March)
Oil and gas extraction	\$40,060,494	\$26,330,308
Petroleum exploration	\$102,016,720	\$71,400,105

9.79 In relation to LNG developments, not only would the state government receive payroll tax from the oil and gas companies themselves; payroll tax would also be generated through the wages and salaries of all those employed to manufacture and/or provide goods and services to oil and gas projects. It would also be generated through the associated flow on effects.

9.80 Due to the Commonwealth business classification system it is not possible to provide information on payroll tax paid by engineering design and engineering consulting services, metal fabrication, manufacturing and ancillary services specifically for the oil and gas industry.

9.81 DSD acknowledges the significant reduction in payroll tax revenue 'where FLNG replaces what otherwise would have been onshore processing of gas.'⁹²¹ Furthermore:

*most State government revenues derived from LNG development are gained from payroll tax and stamp duties paid during the construction phase of onshore LNG projects. Since very little construction work is done in Western Australia, most of that revenue will be lost.*⁹²²

9.82 As Chapters 5 and 6 of this report indicate, employment opportunities in the Western Australian fabrication, manufacturing and construction sectors will decrease with the advent of FLNG developments in Australian waters. At this time, it is not possible to calculate the extent of the loss of payroll tax that will result. It is possible, though, to know that this will be considerable.

919 Ms Nicki Suchenia, Office of State Revenue, Department of Commerce, Electronic mail, 31 March 2014.

920 *ibid.*

921 Submission No. 27, from Department of State Development, 2 October 2013, p 1.

922 *ibid.*, p 5.

- 9.83 Given the significant contribution petroleum industry payroll taxes make to State revenue, the Committee again expresses its concern that there has not been any economic modelling on the impact of FLNG developments. It is essential that the Department of Finance's Office of State Revenue undertakes such analyses as a matter of urgency.

Company data

- 9.84 Apart from general statements such as those provided in the introduction to this chapter, companies could provide little information on the revenue that would flow from FLNG projects. Shell, though, has drawn on its Prelude experience to date and 'developed a picture of the long term benefits to the State from multiple FLNG developments.'⁹²³
- 9.85 The government revenue indicated through Shell's modelling is provided in Table 9.3 and represents revenue over the anticipated 40 years of a project.⁹²⁴

Table 9.3: Government Revenues (nominal)

No. FLNG Units	Western Australia \$ billion	Federal/Other \$ billion	Total \$ billion
3	9–10	79–84	88–94
6	18–20	158–68	176–188

- 9.86 As noted earlier in this chapter, Woodside estimated Western Australian revenue from payroll tax, royalties and Western Australian-originated GST to be approximately \$1.6 billion over the 40 year life of the project. The Committee notes that there is no guarantee that Western Australian-originated GST will be returned to the state. Commonwealth revenue was estimated at approximately \$102 billion including PRRT, company and other taxes. Woodside confirmed that these figures are 'based on a Browse FLNG development with 3 FLNG vessels.'⁹²⁵
- 9.87 Without access to the respective modelling on which these figures are based, the Committee cannot know what is included in each company's data. Therefore, the Committee can only note the large disparity between the Shell and Woodside estimates for the revenue generated by three FLNG vessels over a 40 year period.
- 9.88 Based on 1989–2009 data, in 2009 ACIL Tasman estimated that the taxation and royalty revenue generated by the North West Shelf project was 'approaching \$4 billion per

923 Submission No. 15 from Shell in Australia, 30 August 2013, p 13. Payments to contractors are subject to payroll tax when there is an employer/employee relationship.

924 *ibid.*

925 Ms Laura Kjellgren, Government Affairs Adviser, Woodside Energy Ltd, Electronic mail, 20 March 2014.

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annum’ for the Commonwealth Government and approximately \$0.9 billion ‘for Western Australian State and local governments.’⁹²⁶ Extrapolating this data over a 40 year project life, the Commonwealth Government could expect to receive \$160 billion, with \$36 billion to state and local governments.⁹²⁷

Government reliance on company data

- 9.89 Given the importance of LNG generally, and the proposed James Price Point development in particular, to WA, the Committee reasonably expected that the Western Australian Government would have undertaken considerable forecasting in relation to Woodside’s development of the Browse gas fields.
- 9.90 On 12 July 2013, the Committee wrote to the Treasurer, Hon Troy Buswell, MLA, asking for a submission to this Inquiry. On 7 August, the Treasurer responded by referring the Committee to the Minister for State Development as the Minister ‘able to provide more informed input into the Inquiry.’⁹²⁸ The Treasurer also noted the following:
- there would be no State royalty revenue impact from FLNG operations as they mostly would be in Commonwealth waters;
 - ‘relative to land based operations, there would likely be adverse payroll tax implications’; and
 - project level information was required by Treasury before it could assess any impact of FLNG on State revenue.⁹²⁹
- 9.91 On 12 September, the Committee again wrote to the Treasurer noting that some proportion of the Browse field is located in State waters and asking him to advise whether an FLNG operation in State waters would generate State royalty income.
- 9.92 Additionally, the Committee advised of its expectation that prior to Woodside’s April 2013 decision not to proceed with its James Price Point processing concept, the Department of Treasury (Treasury) would have undertaken preliminary forecasting of the amount of payroll tax, goods and services tax, stamp duty, Grants Commission funding and any other associated state or federal revenue or expenditure that would have been generated if the original onshore development proposal had proceeded. The Committee asked that any such forecast data be provided to assist the Inquiry.
- 9.93 The Treasurer responded to this request on 22 October 2013 advising that as a proportion of the Torosa field in the Browse basin was in State waters, the development of that field would generate royalty revenue for the state. The Treasurer advised that Treasury would rely on DSD and DMP advice when assessing State

926 ACIL Tasman, *Nation builder. How the North West Shelf Project has driven economic transformation in Australia*, ACIL Tasman Pty Ltd, Melbourne, October 2009, p vii.

927 The ACIL Tasman reported in 2008–2009 dollars and included Trains 1, 2 and 3 only.

928 Hon Troy Buswell, MLA, Treasurer, Letter, 7 August 2013.

929 *ibid*.

revenue from Browse, and does not forecast royalty revenue on a project by project basis. Furthermore, as ‘estimates of royalty revenue for any given project are generally only included in revenue forecasts once a project receives final investment approval,’ and no FID had been taken on Torosa, royalty revenue from this field had not been included in royalty revenue forecasts.⁹³⁰

9.94 On 3 October, the Committee wrote to the Premier as Minister for State Development advising him of the Treasurer’s referral and that the Department of State Development’s submission did not include any specific data relating to the potential impact of the James Price Point project upon the state’s economy or on the impact of FLNG on the economy. The Committee invited the Premier to make a submission to the Inquiry, including any available forecast data in relation to the original onshore development proposal at James Price Point.

9.95 On 17 October, the Premier drew the Committee’s attention to DSD’s submission and its advice that there is ‘insufficient information available, either from the proponents, or from comparable projects to forecast either direct or indirect economic impacts of the Floating LNG development.’⁹³¹ The Premier further advised that ‘substantial information about the potential economic impacts of the Browse LNG Precinct Development is available in reports published by the Department of State Development.’⁹³² Additionally, the Premier added the caveat that ‘until a proponent makes a final investment decision, estimates of the scale of investment, employment and local content requirement are speculative.’⁹³³ The Premier asked DSD to help Committee staff access available information and analyse more detailed data.

9.96 The Committee acknowledges that DSD provided email links to several documents.⁹³⁴ These, though, were largely concerned with environmental and social assessments of the project, and contained very little detailed economic data.

9.97 At a hearing, DMP advised that the Department undertook ‘resource management and the modelling of a project as and when we receive information from a company.’⁹³⁵ According to Mr Jeffrey Haworth, DMP has:

received in the past the reserves and resources for Browse and Prelude, for example. The company will then make its own financial investment decision as to which method it will use. The Woodside project was based on a land-based LNG train with platforms out there. We looked

930 Hon Troy Buswell, MLA, Treasurer, Letter, 22 October 2013.

931 Hon Colin Barnett, MLA, Premier and Minister for State Development, Letter, 17 October 2013.

932 *ibid.*

933 *ibid.*

934 Ms Gail McGowan, Department of State Development, Electronic Mail, 9 October 2013.

935 Mr Jeffrey Haworth, Executive Director Petroleum, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 2.

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*at the particular field development plan. As yet Woodside has not submitted a field development plan for its FLNG proposal. We are basically waiting for that to happen so that we can analyse it. We have had a look at the reservoir, especially in the Torosa field, which is the one that will impact the state. Yes, we do have some concerns about how it will develop it, but as yet we have not seen its plans to develop it.*⁹³⁶

9.98 In response to a question as to whether any economic analysis had been done on the impact of Woodside's decision not to proceed with its James Price Point development concept, DSD advised that they could determine within reason the impact on payroll tax and stamp duties associated with the land development, pipes to shore and onshore construction that would have occurred at James Price Point. However, due to a lack of information, what the Department could not do is:

*model the operational and the maintenance jobs well enough for FLNG until we know with more definition what the operator is seeking to do. We know a certain amount about Prelude in terms of what they have decided to do by virtue of using Darwin and WA airports for transport et cetera, and we can get a bit of a gauge about employment in that respect. In terms of the return to the state on the actual resource, yes, that is very carefully modelled on the number of molecules of gas, and they have got a handle on what that means for the purposes of the state.*⁹³⁷

9.99 The Committee understands that the DMP undertakes analyses of the reservoir potential on discovery and of the extraction methodology proposed by the project proponent.⁹³⁸ The Committee also understands that changes to field development plans will necessitate new analyses, particularly as a change in the proposed extraction technology can result in a significant material difference in government revenue.

9.100 The Committee, though, does not understand why DMP, DSD or Treasury are not able to undertake forecasting prior to a proponent presenting its field development plan. That is too late to be of use to the Minister in negotiating the development requirements and to allow the Minister to influence the proponent's decision on field extraction technology. It is essential that government stops relying on company information provided after the fact and engages in economic forecasting in a more proactive manner.

936 *ibid.*

937 Mr Stephen Wood, Director General, Department of State Development, *Transcript of Evidence*, 19 February 2014, p 9.

938 Mr Richard Sellers, Director General, Department of Mines and Petroleum, *Transcript of Evidence*, 19 February 2014, p 2.

Finding 64

Western Australian Government agencies were not able to produce cogent sets of information necessary to facilitate effective government decision-making on resource value and return to the State.

Recommendation 30

Western Australian Government agencies amend their model of advice to government to ensure the responsible ministers are fully aware of the economic implications before the State enters into any agreements.

- 9.101 The net impact of FLNG operations on Western Australian State revenue is largely negative. This has been recognised by government industries, industry and unions alike. For example, DSD states that:

*the economic benefits of FLNG projects for Western Australia are likely to be substantially lower than for onshore LNG processing. [...] Overall, FLNG projects are likely to deliver less revenue to government than their onshore equivalents.*⁹³⁹

- 9.102 Similarly, the Maritime Union of Australia (MUA) argues that:

*Significant impact on the WA economy is going to be the government revenue base—obviously, the loss of jobs, small business opportunities and the taxes et cetera that go with it, the gross state product and uncertainty of energy supply to high-energy users and industry such as Alcoa and those kinds of companies.*⁹⁴⁰

- 9.103 For multinational chemical company Dow Chemical, ‘where FLNG technology is used, the potential benefits of construction activity, local taxes, and downstream economic activity are lost.’⁹⁴¹ Furthermore, while FLNG provides an opportunity to develop remote offshore gas reserves, ‘it does pose a serious loss of revenue to the State and Commonwealth when it is employed as a cost reduction mechanism to avoid onshore construction and operational costs.’⁹⁴²

- 9.104 The Committee has received modelling undertaken by an independent consultant on the revenue from royalties and other taxes from two hypothetical gas projects, A and B, based on the reported size of actual reserves and the quality/makeup of the gas in those reserves.⁹⁴³ Projects A and B reserves and characteristics replicate the Torosa and

939 Submission No. 27, from Department of State Development, 2 October 2013, p 1 and p 5.

940 Mr Ian Bray, Assistant National Secretary, Maritime Union of Australia, *Transcript of Evidence*, 1 November 2013, p 2.

941 Submission No. 6 from Dow Australia and New Zealand, 29 August 2013, p 1.

942 *ibid*, p 1 and p 4.

943 Closed evidence, Closed Submission No. 61, 1 April 2014.

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Scarborough fields for which the proponents' current preferred development concept is FLNG.

Table 9.4: Forecast royalties and other state revenues from two onshore projects⁹⁴⁴

\$m, real 2013-14		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	Total
Scenario: Gas price \$7.18/GJ	Royalties & other taxes	0	49	54	58	17	20	15	-23	-20	-33	-48	-62	202	258	257	744
	Payroll Tax	0	16	20	24	35	41	46	48	52	54	55	56	57	60	61	625
	GST	0	3	3	3	4	4	4	4	4	4	4	4	4	4	4	53
Scenario: Gas price \$7.18/GJ plus latent demand	Royalties & other taxes	3	49	58	67	26	22	19	-14	-12	-26	-40	-60	205	265	276	838
	Payroll Tax	0	16	20	24	38	51	58	63	69	74	77	80	85	89	93	837
	GST	0	3	3	3	4	4	4	4	5	5	5	5	5	5	5	60
Sensitivity: Gas price \$5.84/GJ plus latent demand	Royalties & other taxes	3	63	73	82	16	10	6	-40	-39	-54	-71	-95	168	228	239	589
	Payroll Tax	0	16	20	24	42	56	65	71	78	83	86	89	94	99	103	926
	GST	0	3	4	4	5	5	5	6	6	6	6	6	6	7	7	76

9.105 Table 9.4 shows that over 15 years, and depending on the variables noted, WA could expect to receive between:

- \$589 and \$744 million in royalties and other taxes;
- \$625 and \$926 million in payroll tax; and
- \$53 and \$76 million in GST.

9.106 Overall, and in total, the independent consultants estimate that between \$1,422 million (Scenario 1) and \$1,735 million (Scenario 2) would be received by the State for an onshore development. The development of a field such as Torosa using FLNG technology means that revenue of this magnitude will not be received by the state government. This clearly demonstrates why the Western Australian Government's preference for the development of Australia's resources is, and should be, for onshore processing.

9.107 This negative impact will be compounded if the supply of domestic gas is not ensured to facilitate the development of industry in Western Australia.

9.108 It is not appropriate for government to wait for this impact to be felt. It is essential that the government takes a proactive approach and, first, undertakes accurate forecasting of the economic impact of FLNG of State revenue and, second, takes steps to mitigate this loss.

9.109 The Committee is seriously concerned at the loss of revenue to the State and agrees with the comments from Dow Chemical at paragraph 9.103.

944 *ibid.*

Finding 65

Where FLNG technology is used:

- the potential benefits of construction activity, local taxes and downstream activity are lost; and
- a serious loss of revenue to the State will result.

Recommendation 31

The Western Australian Government, as a matter of priority, undertakes economic modelling of the loss of petroleum industry revenue to the State resulting from the introduction of FLNG, including, but not limited to, payroll taxes.

Chapter 10

Concluding remarks on the impact of FLNG on Western Australia

- 10.1 This Inquiry investigated the impact of FLNG technology on the Western Australian (WA) economy when used to develop petroleum resources in Australian waters. In particular, this report identifies the manner in which the use of FLNG operations will impact upon the engineering and design; fabrication and manufacturing; and construction and ancillary services sectors of the WA economy. It also identifies the impact of the use of FLNG on domestic gas supply and industrial gas users, and comments on the impact on WA's State revenue.
- 10.2 Onshore LNG projects have historically been a major driver of WA's economic growth. Despite the assurances by major project proponents, the Committee has found that the impact of FLNG technology on WA generally will be negative.
- 10.3 While there will be some opportunities for subsea engineering and design, the Australian engineering sector will largely be excluded from the FLNG design process due to the use of global engineering, procurement and construction management contracting.
- With the introduction of FLNG technology, manufacturing and fabrication opportunities will be significantly reduced.
 - Those in the construction industry will face major challenges with the deployment of FLNG technology, with construction opportunities largely disappearing.
 - There are some opportunities for WA businesses and workers to provide ancillary services and support during the operations phase of FLNG projects, and for WA to cement its reputation as a world class provider of workplace training and development.
 - The loss of opportunity in these major sectors of the WA economy will be exacerbated by the loss of downstream activity.
 - There is a huge appetite for domestic gas for industry in WA. Developing resources using FLNG will not deliver any domestic gas from these fields. This will impede economic development in the state.
 - There will be a serious loss of revenue to the state government.

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- 10.4 These issues are of major concern to the Committee. The Committee urges the WA Government to negotiate with the Commonwealth Government to ensure the state receives a maximum return for its resources, including royalties, taxes, and industrial and other economic development.
- 10.5 Analysis of the Committee's research and the evidence presented in submissions and hearings has revealed a number of other issues associated with the introduction of FLNG technology off the coast of WA.
- Government policy, including local content provisions, at both a state and federal level, may not be relevant to FLNG projects in Australian jurisdictions and need to be reviewed as a matter of priority.
 - There is a lack of certainty in relation to legislation such as the *Offshore Petroleum Greenhouse Gas Storage Act 2006* (Cth) and the *Australian Jobs Act 2013* (Cth), which is a cause of concern for industry. There is also uncertainty in relation to the status of research centres committed to by the former federal government.
 - The work of state government agencies is largely reactive, rather than proactive. Processes, together with a reliance on company provided data, do not allow agencies to effectively advise their ministers. Given the importance of domestic gas resources to the economic growth of the state, there is insufficient planning and analysis by government agencies. A more proactive approach could make a telling contribution.
 - Despite project proponents' reassurance that local content providers would be the beneficiary of significant work on FLNG projects, local industry generally do not feel they are given full, fair and reasonable opportunity to participate.
 - The Committee heard considerable evidence from project proponents that investment in the WA resources industry was at risk, largely due to over-regulation, comparatively high costs and lower productivity than other jurisdictions. Notwithstanding these concerns, the Committee notes that WA remains one of the world's most attractive locations for mining investment.
- 10.6 It is the Committee's view that there has been a fundamental shift in the relationship between project proponents and the Commonwealth Government, and that recent decisions such as that about the Browse Joint Venture's Retention Leases are not in WA's best interests. The unilateral and unprecedented decision by the former Minister for Industry, Hon Gary Gray, MP, to approve variations to the Retention Leases opened the way for Woodside to withdraw from its once preferred position of processing Browse gas at James Price Point. This represents a loss to the state of huge proportions.

- 10.7 Hon Gary Gray, MP, ‘take[s] the view that companies, not governments, are best placed to determine which developments are the most commercially viable.’⁹⁴⁵ Nevertheless, it is the Commonwealth Government’s responsibility to assess the commercial viability of the recovery of petroleum resources in the area covered by a Retention Lease. It is not clear how rigorously the Commonwealth tests the assumptions and statements made by project proponents in support of their Retention Lease variation applications. The Commonwealth Government’s reliance on information, analysis and conclusions provided by project proponents abrogates its responsibility as a decision-maker on behalf of Australian citizens.
- 10.8 The mineral resources of the state are held by the Crown in trust for the people of WA, and ownership is not transferred on the signing of a Retention Lease. There does not seem to be sufficient recognition of this fact by either the project proponents or the Commonwealth Government.
- 10.9 It is essential that all stakeholders, including the WA Government, have input into the consideration of various development options. This would help ensure that WA’s petroleum resources are developed in a manner that maximises resource recovery and benefits to project proponents, the state and its industries. At the same time, it is important that project proponents, which are mostly large multinational companies, have a legitimate reason for holding Retention Leases and are not able to hold leases for prolonged periods simply to obtain a competitive commercial advantage. Such warehousing of reserves, which may be able to be developed by other proponents, is not necessarily in the best interests of the state.
- 10.10 The Committee undertook this Inquiry out of concern for the Western Australian economy and people. Unfortunately, the Committee has found it was right to be concerned. Nevertheless, the Committee also believes that there may be potential opportunities for WA. The Committee intends to undertake further investigation in relation to other opportunities that may arise from FLNG technology and table a separate report in the Legislative Assembly.
- 10.11 This Inquiry has also revealed the need for more cooperation between governments, between governments and project proponents, and between project proponents. This would facilitate the more efficient and effective development of projects, particularly if resource companies developed more infrastructure sharing arrangements.
- 10.12 The Committee also intends to meet with the federal Minister for Industry, Hon Ian Macfarlane, MP, to discuss its concerns.
- 10.13 Finally, it is important to note that the Committee is not opposed to technological innovation and recognises the technological advancement represented by Shell’s

945 Submission No. 58 from Department of Mines and Petroleum, 17 March 2014, p 4.

Chapter 10

'Prelude' FLNG design. The Committee's concern is that WA is able to maximise its opportunities from technological developments.

A handwritten signature in blue ink that reads "Ian Blayney". The signature is written in a cursive style with a large, stylized 'I' and 'B'.

Ian Blayney, MLA
Chairman