FLNG Sub. 26

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The Economics and Industry Standing Committee
Inquiry into the Economic Implications of
Floating Liquefied Natural Gas Operations

Via e-mail to: laeisc@parliament.wa.gov.au

To whom it may concern

The Association of Professional Engineers, Scientists and Managers Australia (APESMA) represents technical professionals in Australia, with coverage of engineers nationally, performing design, scoping and project management roles across essential industries and services including IT, mining, construction, water, power, road and rail. APESMA has an active membership in Western Australia who have become increasingly concerned in recent years about the lack of dividend for the State from large scale LNG projects which have been undertaken there.

In particular, they are concerned that project proponents have not been providing fair opportunity to local engineering firms to bid for engineering works and have instead utilised international providers, thereby 'offshoring' the work. This has been the subject of work we have been undertaking for the Western Australian Government. APESMA believes that the current resources boom should be leveraged to build an innovation sector in Western Australia which will deliver high-skill, high-wage jobs in perpetuity for the State. APESMA believed that while Western Australia's natural resources are finite, its human resources are not. I attach a copy of that report to inform the committee's deliberations on this matter "Report to the Western Australian Government on Local Engineering Issues and Policy".

In this report, APESMA specifically raises the potential impact – or lack thereof – of Floating Liquefied Natural Gas (FLNG) on the local engineering sector.

> "In the future many gas fields that previously would have seemed inaccessible or were not economically feasible will begin to be opened up through FLNG technology. FLNG technology is currently being developed to allow for an LNG process train to be designed on-board a floating platform anchored at sea above a gas drilling site, thereby eliminating the need to run pipelines to an onshore processing terminal...

> Due to the nature of such projects they will have no major footprint on or connection with the Western Australian mainland. With no onshore construction needed this technology will drastically affect the levels of local content produced by the local Australian workforce. Not only will the entire design and procurement of the project occur overseas but the entire construction phase as well".

Unfortunately, in APESMA's view, the opportunity to maximise the benefit Western Australia gains from its natural resources is already – and rapidly – slipping. 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%[1]. At the same time, there has been a collapse of -23.9% in demand for engineers in Western Australia[2]. The Internet Vacancy Index is also showing a plummet in the "count of online vacancies newly lodged on SEEK, My Career, CareerOne and Australian JobSearch" for engineers of 60 per cent year-on-year to May 2013[3]. We are now importing services at the expense of fostering local employment and industry opportunities.

Within this report, we make a range of recommendations to government about what practical policy initiatives they can undertake to ensure that Western Australian received maximum long-term benefit from LNG projects undertaken in the State. We have welcomed the opportunity to work collaboratively with the Western Australian Government on this issue and look forward to constructive relationship going forward.

We would welcome the opportunity to give evidence to the inquiry, or to provide further detail to the content of the report should the committee wish.

Yours sincerely

C. G. Walton

Chris Walton, CEO

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[1] Department of Foreign Affairs and Trade. *Trade in Services Australia 2011. http://www.dfat.gov.au/publications/stats-pubs/trade-in-services-australia-2011.pdf.* Last accessed 21 August 2012.

[2] Kaspura (2012), p28. *The Engineering Profession. A Statistical Overview, Ninth Edition.*

[3] Department of Education, Employment and Workplace Relations. *Vacancy Report. http://lmip.gov.au/default.aspx?LMIP/VacancyReport.* Last accessed June 7, 2013.

Report to the Western Australian Government on local engineering issues and policy

February 2013

The Association of Professional Engineers, Scientists and Managers Australia

Contents

Definition of Terms

EPCM	-	Engineering, Procurement and Construction Management
FEED	-	Front End Engineering Design
FLNG	-	Floating Liquefied Natural Gas
LNG	-	Liquefied Natural Gas
Mtpa	-	Million tonnes per annum
OH&S	-	Occupational Health and Safety
Project Proponents	-	Operators and/or owners of the gas project
Train	-	Liquefaction unit to process gas to liquid for transport

About APESMA

APESMA

The Association of Professional Engineers, Scientists and Managers Australia represents professionals in Australia, with coverage of engineers nationally, performing design, scoping and project management roles across essential industries and services including IT, mining, construction, water, power, road and rail.

Executive Summary

This report for the Western Australian Government has been prepared on behalf of APESMA. APESMA has been working to facilitate an ongoing dialogue with its members, local engineering firms and other key stakeholders regarding shifting trends in the procurement of engineering services for LNG developments in Western Australia and the effect this is having upon the local engineering market. APESMA has highlighted these trends – and the concerns of its members who have been impacted by them. In response the Western Australian Government through the Department of Commerce has worked directly with APESMA to find new ways to maximise the opportunities for local engineering firms from the State's LNG industry. APESMA has consulted extensively on the current and past potential policy solutions and this document represents the culmination of these efforts. Extensive quantitative research has provided much of the information in this report.

APESMA would like to thank the Western Australian Government for their support.

Specifically this report identifies strategies the Western Australian Government should consider implementing to assist locally based firms to become more engaged in the engineering and design of LNG plants and provide an opportunity for more Western Australian engineers to develop high-class skills and experience in the oil and gas sector.

The focus of this is not necessarily to deliver profits to local firms, but to provide a dividend to the Western Australian economy and public over the longer term – to ensure that we can continue to be high-growth; high wage economy by ensuring the resources boom leaves a lasting innovation footprint in our State. We should aim to ensure that Western Australian engineering services are internationally recognised as leaders in the sector and well positioned for future opportunities both domestically and internationally – so that the State can derive full benefit from these projects by becoming an internationally recognised engineering Centre of Excellence and net exporter of engineering services in years to come.

Summary of recommendations

Opportunities to participate

Unlike many other countries, Australia is a proud free-trading nation and does not have mandated levels of local content for major oil and gas projects. Currently the Western Australian government asks that project proponents ensure local industry receives full, fair and reasonable opportunity to participate in major projects taking place throughout the State[1]. However, this policy has been unable to facilitate the development of a significant engineering design team in Perth that is able to compete for future LNG projects both in Western Australia and the region. With an increasing number of operational service contracts and expansion projects set to be awarded on LNG projects over the coming years it is important that our local engineering market is afforded every opportunity to bid for these opportunities. In consultations with local engineers, the way that contracts are structured and developed has been identified as a key obstacle to the participation of local firms.

Recommendation

1. *That in future State Agreement Acts the Western Australian Government seeks commitments that the structure and size of future contracts do not directly or indirectly preclude the involvement of the local engineering market.*

Leveraging projects for a lasting dividend

The Western Australian engineering industry must target high-skill work if our wider economy is to remain internationally competitive. We are a high-skill, high-wage economy that is better placed to compete for high-yield technical work. . We need to make all efforts to ensure we keep a competitive advantage against many lower cost markets in our region by providing the most innovative high quality engineering solutions, thereby driving productivity and innovation to keep our local sector competitive. It should not be our aim to compete for less technical, less profitable work as it is both unachievable and undesirable.

Western Australia's recent boom in LNG provides a prime opportunity for operators to engage the local engineering workforce and allow them to gain knowledge and experience in how to design and maintain LNG plants. Once these major plants are built they will continue to operate for the next 30-50 years and with that there will be a continuing demand for engineering services. Western Australia must build its intellectual capital to provide the engineering capacity needed to support the extraordinary growth in LNG production capacity over the coming years. A short term focus on delivery of projects does little to deliver a long-term dividend from these massive and lucrative

[1]Department of Commerce - Industry, Science and Innovation, *Western Australian Government Local Industry Participation Framework.* Government of Western Australia Department of Commerce, July 2011.

projects. A lasting local dividend of a highly skilled workforce which can continue to drive a high-wage, high-growth economy must be a priority for any government.

It is important current and future developments provide opportunities for future generations to gain valuable oil and gas experience. Local firms should not be ignored, there needs to be willingness from project proponents to involve local engineers and provide them with honest feedback that will allow them to improve their capabilities and become a more competitive option for future contracts.

Recommendation

2. *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.*
3. *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.*

Registration of Engineers

Engineers are fundamental to our State's prosperity. Engineers design, build and maintain the infrastructure, devices and systems that are part of our everyday life allowing our economy to function efficiently and most importantly, safely.

In many other jurisdictions around the world there are strict legislative requirements that must be met in order to provide engineering services. In Australia the only State where engineers must be registered to provide engineering services is Queensland. In Western Australia there are a number of professional services that may only be provided once strict educational and competency standards are met due to the responsibility that comes with their line of work. Doctors, lawyers and architects are but a few of the professions that must pass certain legislated criteria before they can legally offer those services. This does not apply to the engineering profession even though the consequences of poor engineering can be disastrous to our economy and fatal to human life. A registration system for engineers should be implemented to ensure only sufficiently competent engineers are able to provide engineering services, whilst at the same time lifting the status of the profession so it stands – rightly – with other professions which are subject to registration schemes.

The government should ensure any registration system is regulated independent of any one organisation and the system is straightforward and affordable to prevent an unfair cost and time

burden being placed on people in the engineering profession, engineering organisations and the community.

Recommendation

4. *That the Western Australian Government introduces legislation that requires the registration of engineers wishing to provide engineering services where those services impact upon public health and safety. To enable this, legislation should be drafted under which professionals working in these areas are identified as needing to register. In doing so the Western Australian Government should contemplate the possibility of a national registration scheme in the future and implement its own scheme with Federal harmonisation in mind.*

Government Assistance

The role of the Western Australian Government should not be to act as the gatekeepers for resource developments but to assist in providing the investment climate that will continue to attract future developments. Providing appropriate incentives for work completed within the State rather than offshore will make local engineering services more cost competitive. Tax income is already being lost through offshoring so any assistance will benefit the wider economy.

The proponents of major resource projects often face problems navigating through the complex regulatory system across different levels of government and between different jurisdictions. These projects take years to obtain the required regulatory approvals needed for a final investment decision to be made and in that time world economic conditions and demand for resources can easily change.

Many problems that hinder resource developments occur when Government and industry fail to understand one another's objectives and the difficulties they each face, leading to breakdowns in efficiencies. To improve this situation the Western Australian Government needs to actively open up an honest and regular dialogue for the engineering profession to air its concerns and the Western Australian Government resolve them.

Recommendations

5. *That the Western Australian Government works with industry and the Federal Government to provide financial assistance and tax breaks to help Western Australian based engineering companies remain competitive in the context of a high Australian dollar and a fragile international economic climate.*

6. *That the Western Australian Government works with industry to simplify the regulatory and approval system through greater collaboration between Federal, State and Local government to remove duplications across different jurisdictions and improve efficiency.*
7. *That the Western Australian Government set up streamlined approval process for engineering design work that has been completed in Western Australia by Western Australian registered engineers.*
8. *That the Western Australian Government sets up a clear line of dialogue between the local engineering industry and the Department of Commerce with quarterly meetings to discuss what measures can be taken to assist local industry in winning more work on oil and gas projects.*

Establishing stronger relationships

Many project proponents have established means of conducting business and have their own preferred contractors for certain types of work. Many are very reluctant to change their established business practices and alter the supply chain to allow local engineers to be more engaged. The contracting and procurement decisions of major project proponents demonstrate a willingness to stay with the established global centres of engineering design, providing little possibility for Perth based firms to compete with them in the future.

This behaviour makes it hard for local companies and local engineers to break into the contracting process. Local companies may tender for work but the sentiment among many local engineers is that project proponents only pay 'lip service' to local companies and will eventually choose an established international engineering design company because they have experience in LNG developments and a history of working in partnership[2].

Local firms must also be realistic about their capabilities and goals, their greatest opportunities in the long term future are in operational services and asset support of upstream and downstream operations. With LNG production capacity set to more than triple by 2016-2017[3] there is an increasing opportunity for engineering services that the local market can position itself towards. By establishing partnerships with major project proponents local engineering firms will be well placed to be involved in future improvements in technology. However only those companies that are innovative and provide competitive services that help to achieve productivity gains and drive down costs will be successful.

Major oil and gas companies will continue to partner with the companies who possess specialist expertise that complement their development goals. It is important that Government seeks

[2] APESMA (2012) Engineering Member Survey, August-September 2012.
[3] LNG production is expected to grow from 15 Mt in 2011-12 to a capacity of almost 50 Mt in 2016-17. Government of Western Australia Department of State Development, *Western Australia Economic Profile* January 2013.

commitments from major oil and gas companies to actively open up and engage the local market to develop key skills and expertise that will be required over coming decades whilst providing the policy settings for this to occur. Strong commitments from oil and gas companies to engage the local engineering profession will help to provide certainty to local companies wishing to invest in innovation, recruitment and training.

Recommendations

9. *That if a project proponent wishes to operate in Western Australia then locally based engineering design firms must not be excluded from preferred tender lists. Local firms must be included in discussions surrounding prequalification and if the local market is unable to provide services due to a lack of capacity or capability then project proponents must provide detailed reasons outlining why this cannot be provided by the local market so that measures can be implemented to address shortfalls.*
10. *Both State and Federal Government work together to encourage innovation and the development of key skills required for future demand in the oil and gas industry with a clear focus towards developing highly technical skills and creating the jobs of the future. This would involve funding the development of a business case to develop Perth into a 'smart hub' for the education and training of highly technical engineering services.*

Perth: an Engineering Centre of Excellence

Western Australia has experienced strong economic growth in recent years fuelled by unprecedented demand for our natural resources, leading to an extraordinary increase in the number of mining developments and expansions. However the current boom is already showing signs of slowing down and it is important that both the State and Federal Government put in place measures that can maintain our growth and prosperity. The salient lessons of countries such as Norway who leveraged their natural resources to build a lasting innovation economy which prospers to this day should be heeded.

Our LNG is finite. Out intellectual capital is not.

Engineering services face increasing competition from low-cost Asian competitors whose skill sets and experience continue to develop. If Western Australia is to remain a high quality provider and remain internationally competitive, measures must be taken to ensure that our engineers continue to innovate and become world leaders in specialised fields. Federal and State governments should work together to establish Perth as an internationally recognised Engineering Centre of Excellence and leverage the opportunity that our resource development presents to provide lasting world class industries for the future.

Recommendation

11. *Government, Industry and Universities become far more integrated in their long term approaches to developing engineering capabilities in Perth. This already occurs to some degree in an ad-hoc manner however greater linkages and a more detailed long term strategic plan must be developed.*
12. *The Federal and Western Australian Government work together to establish Perth as an international engineering design hub through the development of an Engineering Centre of Excellence.*

Introduction

Australia is experiencing a boom in major gas developments with Western Australia leading the way. The Australian LNG industry is set to triple in size by 2016-17[4] with Western Australia's gas-rich northwest coast region being the epicentre of the construction boom. Engineering skills are critical to ensure that Western Australia can sustain this growth. More than $188 billion worth of LNG projects are planned or currently under construction in Western Australia alone[5] and Australia is forecast to become the world's second-biggest exporter of LNG[6].

Western Australia's proximity to growing Asian markets in need of long term, reliable supplies of energy from cleaner-burning fuels will mean that our LNG will be in high demand for decades to come. Western Australia should look to harness this opportunity and improve engineering capacity to ensure the LNG industry's sustainability and position Western Australia for a future beyond the current boom. In the short term Western Australia will export its gas resources but in the future our goal will be to export our intellectual capital. Our gas resources are finite – we can only sell them once - however the knowledge base and the intellectual property cultivated through working on major resource projects will leave Western Australia with lasting benefits.

The Western Australian engineering profession's goal is to be internationally recognised for their high level of skills, expertise, reliability and competitiveness. For this reason the Western Australian Government should not look towards legislating mandated quotas for local participation and should focus their resources towards providing incentives and assistance that will allow our engineering industry to thrive and improve.

Engineers play an integral role in our society. They design and develop structures, machines and processes while driving technological advancements. They plan, build and maintain our infrastructure and are relied upon to provide efficiency, reliability and, most importantly, safety in operation. Engineers drive innovation and ensure that we are able to meet future challenges - their skills help our society deliver and maintain a competitive edge. Maintaining a highly skilled and experienced engineering industry is a strategic interest for Western Australia's continued economic prosperity.

Our engineers are respected and relied upon for the skills they provide to our community. They are trusted with the responsibility to ensure that our built environment is developed, managed and maintained to the highest levels, ensuring our high standards of living are preserved. Engineers provide the quality assurance in maintaining the systems and structures of a healthy economy. Local engineers are unique in that they offer a wealth of knowledge and experience delivering outcomes in Western Australia's difficult and unique operating conditions. In a resource-driven state like

[4] Australian Government Bureau of Resource and Energy Economics, *Gas Market Report* July 2012.
[5] Government of Western Australia Department of State Development, *Western Australia Economic Profile* January 2013.
[6] Australian Government Bureau of Resource and Energy Economics, *Gas Market Report* July 2012.

Western Australia support for a strong local engineering industry is required to ensure we have the local skills to develop and maintain plants effectively and to ensure our economy remains strong.

State and Federal governments along with key stakeholders in the oil and gas industry should seek to collaborate to ensure that not only can LNG plants be constructed, but they also be developed, expanded and maintained to the highest possible standards.

Local engineers should be afforded the opportunity to gain practical experience on these projects from the earliest stages through to their commissioning and operation. Local engineers help to ensure projects in Western Australia's LNG industry are not only designed properly the first time but are also developed and maintained appropriately throughout their production life.

The LNG industry at many times has faced a shortage of appropriately skilled and experienced engineers. The only way to address potential shortages is to ensure that future talent is enticed towards a lasting career in the engineering industry. Ensuring that there is a strong and consistent pipeline of work that Western Australian based firms can confidently tender for will allow firms to develop graduates, and recruit and retain the best engineers to Western Australia.

Project proponents require a skilled workforce during the operational lifespan of a plant. When engineering firms have the confidence that Western Australian engineering talents will be fully engaged in all aspects of major projects they will be encouraged to invest in recruiting and developing graduate with the skills to provide the engineering capacity required for Western Australia's longer term future[7]. Engineers with a history of working through a plant's development as well as a strong understanding of Western Australia's unique operating conditions will be better placed to ensure a plant operates to capacity into the future.

Large multinational EPCM companies will dominate the LNG megaproject market into the future however a greater involvement from local firms and their employees throughout the life and breadth of a project should be encouraged. This will lead to stronger relationships between proponents and local engineering firms while increasing local skills.

Greater support for the local engineering industry will ensure Western Australia leverages the opportunities provided by our natural resources to develop and retain local talent and skills critical to Western Australia's long-term prosperity. It will facilitate a long term future for our State where we have a lasting innovation economy and continue to be an exporter of not only non-renewable resources – but the ultimate in high value renewable resources: knowledge. If carefully planned, the resources boom can deliver an engineering services sector which can sustain Western Australia as an export economy for many years to come.

[7]The Senate - Education Employment and Workplace Relations References Committee, *The Shortage of Engineering and Related Employment Skills,* Commonwealth of Australia, July 2012, p74

Explanation of Project Phases

Feasibility or Pre-FEED

Engineering services are required to scope various initial concepts and advance a potential business case to help determine a suitable development option to proceed with. Pre-Feed is the conceptual design of a project where the preliminary feasibility study is carried out by the project proponent. Rough estimates are done as to costs and a potential site and style of development is chosen. A business case is developed to determine whether to proceed to the FEED stage for a specific project.

FEED

FEED is the preplanning that occurs prior to the detailed design of a project. It includes the scoping of a project including the preliminary works to determine the estimated costs to a greater level of accuracy than the pre-FEED. This involves detailing what engineering work will need to be completed and what issues may arise so that a project may be accurately budgeted for. This is where the different standards of design are set for future detailed design work and procurement.

This is the planning stage of a project where a specific design can be chosen and the feasibility of a project can be determined. This is very influential and therefore important phase of the project as it is often where design standards are set. If Australia's unique standards and environmental conditions are not taken into consideration at this point it can often lead to cost and time blowouts as rectifications must be made later on in the project[8].

FEED is an initial plan or outline of what will need to be completed. It involves preliminary engineering to indicate what will need to be completed in the future, what difficulties will need to be overcome, as well as an estimate of costs. It does not give enough detail for procurement and construction. The FEED may be used to source funding and approvals for a project to be able to proceed. The FEED stage is very important and very influential upon the future of the entire project

[8] An example where Australian design standards were not taken into consideration was during Woodside's Pluto project when substandard flare towers were installed leading to cost and time rescheduling after they had to be redesigned and replaced.
Woodside Petroleum Ltd, *Pluto Cost and Schedule Update*, Perth Western Australia, Friday, 17 June 2011;
Another example is the recent announcement by Chevron that "The factors contributing to the increased costs and schedule impacts include labour costs and productivity associated with Barrow Island site infrastructure, logistics challenges and weather delays," which can be attributed to poor planning and knowledge of Australian labour costs, climate and logistical issues.
Gorgon costs blow out, schedule slips, *The West Australian,* 6 December 2012. Available: http://au.news.yahoo.com/thewest/a/-/newshome/15567340/gorgon-costs-blow-out-schedule-slips/Last accessed 21 January 2013.

and it must be done to a very high standard and therefore requires input from some of the most experienced and skilful professionals in the industry.

Unlike many other LNG projects around the world where labour costs are low[9], Western Australia's northwest region's remote location makes it a very expensive climate to operate in. This is due to logistical problems associated with transporting supplies in, as well as the relatively high cost of Australian labour. Ensuring that the FEED stage is completed appropriately with a strong awareness of the difficulties operating in North Western Australia is integral to the overall success of the project.

Detailed Design

This involves getting the relevant engineering experts to design the specific development with sufficient detail so that it may be constructed and installed. It involves all the studies to be performed before construction of the plant, detailed drawings of all plans to be ready for construction, purchasing of equipment and the planning of start-up procedures.

The total engineering design component of a major resource project will usually be about 10% of the overall project cost this includes a FEED component (usually being around 3%) and the detailed design (which usually is about 5-7% of the overall project cost)[10].

Procurement and Construction

Once the detailed design of the project has been completed the procurement of materials and transportation to site begins and the plant begins to take form. Often these days much of the major components of the LNG are constructed overseas and shipped to site in modular form. Technological advances in recent years have allowed large modules to be constructed offshore in low-cost centres in places such as Indonesia and Malaysia that are then shipped to site where they are put together. This has meant that more engineering and construction work has been lost to offshore locations.

Commissioning

Once an LNG plant has been constructed it will then need to undergo commissioning before it enters full production. Commissioning verifies if the equipment in plant operates according to its design,

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[9] The world's major LNG exporters include countries such as Qatar, Malaysia and Indonesia which account for 50% of the world's LNG export volume. The labour costs in these countries are far lower than Australia's. Australian Government Bureau of Resource and Energy Economics, Gas Market Report July 2012.

[10] Martin West. Department of Commerce, *Assessment of the Engineering Design Capability and Capacity in the Oil and Gas Sector in Western Australia*, Government of Western Australia, September, 2011.

this involves testing and inspecting all the parts of the plant to ensure that all systems and components will function effectively and safely before it is powered up and begins operating. This requires engineers with a strong knowledge of the different processes involved in the plants operation and the analytical skills to be able to identify and rectify potential problems. For these reasons it is important that local engineers are exposed to current LNG design and construction processes so that they are sufficiently qualified to undertake commissioning onsite once the project has finished being built.

Operations and Maintenance

Once a plant enters its production stage it will need to undergo continuous maintenance. This may include the management of the plant itself, designing and developing improved management processes in areas such as professional safety, logistical planning and scheduling; preventative maintenance in the aim of predicting and avoiding potential failures, production loss and safety violations; as well as maintenance to repair breakages and to increase productivity. LNG plants and associated upstream facilities are extremely complex systems; their immense size and long term production life of many decades require a continual supply of engineering services. This operating stage presents a great long term opportunity for Western Australian engineers to train up and become engaged in the LNG industry helping to increase the states engineering capacity and capabilities. Local engineers are far better placed to be involved in this stage of a major LNG project due to the need to have an onsite presence able to examine and fix problems.

Local opportunity

Generally local firms will have a business acquisition department that identifies opportunities and develops relationships both formal and informal with project proponents. This is how a firm identifies future work and positions itself to be able to competitively bid for tenders. The problem local engineering firms now face is that more and more international oil and gas companies are investing in Western Australia. These companies often do not have strong ties to the local engineering market but rather have established links to engineering firms with design centres based offshore. These established links make it harder for local firms to break into the exclusive group of engineering design firms that provide services to the LNG industry.

Current position of LNG engineering in Western Australia

Opportunities to participate

Many locally based companies tend only to be engaged in the construction stage of major LNG projects once an established local workforce is required. Local engineers have therefore had little influence upon major projects with the responsibility for the lucrative high-end work in the most senior and strategic management positions being handled by the large multinational EPCM's offshore office. This has meant there has been little opportunity for the development of local skills for the most important and challenging aspects of a major LNG development. These lost opportunities exacerbate the poor future prospects of the local engineering market because the industry doesn't have enough recent relevant experience in LNG design and engineering making it difficult to compete against established overseas engineering centres in the future[11].

Providing opportunities to be involved in the most challenging and interesting projects will help recruit, retain and develop the highly skilled engineering workforce needed for Western Australia's LNG industry. This means being involved in Greenfield projects developing state-of-the-art LNG process designs. Although many local engineers have been involved in the LNG industry in some manner, there has been a lack of consistent engagement throughout the entire life and breadth of major projects. In particular, local firms find it hard to become involved at the earliest stages of a project – the pre-FEED and FEED stages[12] –making it hard for them to become engaged in some of the more lucrative and challenging contracts in the subsequent stages of a project..

Project proponents will require engineering services for decades to come and it is in their best interests to encourage the development of a highly skilled and competitive local engineering workforce. Sometimes it may be more efficient to have some of the more straightforward work completed in lower cost design centres overseas, however, what local engineers are most concerned about is ensuring that much of the high-end and challenging engineering work is done here in Australia[13]. Local companies that are given opportunities to joint venture with partners and work through an entire project from the pre-FEED stage through to commissioning are then able to market themselves as an experienced and capable challenger to the select group of established multinational engineering design companies.

[11] See table on page 20 outlining where engineering design has occurred for recent LNG projects.
[12] See table on page 20 – where an international engineering firm has been awarded the EPCM they have traditionally carried out the most if not all of the preFEED/FEED.
[13] APESMA (2012) Engineering Member Survey, August-September 2012.

Long Term Benefits

Many project proponents argue that Australian engineers are not cost competitive and that the only way for projects to be commercially viable is by making savings through the contracting of a foreign engineering workforce. However, the major engineering centres that have historically designed LNG projects in our state that have a sufficiently experienced and qualified workforce to complete high-end engineering design work are generally based in high-cost centres such as the UK, USA, France and Japan. These centres have traditionally had similar cost bases to ours. Although Australian engineering costs may have risen in recent times, project proponents have not fully appreciated the benefits that can be made through engaging local engineers throughout the planning and design stages of a project. Local engineers have experience operating in Australian conditions and their knowledge of our unique regulatory systems surround issues such as OH&S and environmental standards make them well placed to assist in the early planning stages of major projects.

There is no reason why design offices cannot be established in Perth for the most detailed and technical work if centres in cities such as Yokohama, Houston or Paris are being utilised[14]. If LNG proponents completed the FEED component of major projects in Australia this would only represent at most about 3-5% of the overall project costs. When there is potentially only a slight saving - within that 3-5% overall project cost - in sending FEED work overseas the cost savings are negligible when compared to the overall project costs.

Oil and gas proponents must earn their social license to operate and companies should work hard to engage the local community if they want to have a lasting involvement in Western Australia. Oil and gas proponents should be conscious of the long-term benefits they gain from accessing our natural resources and the security they get from doing business in a low risk country like Australia[15]. If companies wish to profit from the Western Australia's resource wealth then part of their social license to operate includes the responsibility to engage and develop local skills. The added benefits of stronger local engagement is that that once a project is embraced by the local community there is a greater willingness to work for the long term prosperity of the plant's future.

Overseas design centres are not well placed to understand the unique problems associated with building a plant in Western Australia's northwest, one of the world's most remote and inhospitable locations. The distinctive problems associated with building a plant in Western Australia are different to anywhere else on earth – the isolation and lack of resources and nearby supply centres; our high standards for environmental protection and OH&S; and our unique legislative requirements surrounding building and construction approvals such as our electrical standards are but a few examples. These difficulties are often not fully comprehended by major project proponents when

[14] See table on page 20 outlining where engineering design has occurred for recent LNG projects.
[15] R Jacobs, 2012, *The Global Market for Liquefied Natural Gas,* Bulletin- September Quarter 2011, Reserve Bank of Australia p22- 23.

tendering out their engineering design and project management work[16]. Failures to meet Australian standards have shown that many of the early savings made contracting overseas design centres are lost due to rectification costs and time delays. This makes the argument that cost factors are preventing Western Australian based companies from winning work seem less convincing.

Advantage of incumbency over local industry

Many multinational EPCM's based outside Australia have been operating in the LNG industry for decades. The considerable size of many of these 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.

In reality international engineering firms see no advantage in collaborating with Western Australian based firms in the LNG process design as they may one day become their competitors who may aim to win work away from them in the future. It is therefore in their interests to keep most high-end work away from Western Australian engineers. These established international EPCM's have an advantage over Western Australian based engineers in that they have experience designing LNG projects around the world. Their position of incumbency makes it hard for local firms to grow their skill sets to compete with the much larger, multinational EPCM's.

If a company based offshore wins a major contract in Western Australia there should be an expectation that offices be set up in Perth or joint ventures be formed with local partners so local engineers can be employed who will have a significant responsibilities throughout the project.

The table on the following page shows where major engineering design work has been completed for LNG projects in recent years, which demonstrates that despite capabilities being demonstrated on many projects, the trend has been away from using local firms in recent years.

[16] Many LNG projects have been delayed and/or had cost blowouts due to problems associated with WA's unique conditions, an example is the Woodside Pluto project's flare tower which was not built to Australian standards. Having a strong presence in Perth where significant project decisions are made would help to mitigate these problems.
Woodside Petroleum Ltd, Pluto Cost and Schedule Update, Perth Western Australia, Friday, 17 June 2011.

LNG Projects	Period	Operator	Engineering co for Design/FEED	Main design office location	Comments
Dom Gas	Early 1980's	Woodside	Shell	Holland	Onshore Project
LNG Trains 1 & 2	1984	Woodside	Kellogg, JGC & Raymond joint venture (KJR).	Yokohama	Very large onshore Project,
LNG Train 3	1989	Woodside	Kellogg, JGC & Kaiser joint Venture (KJK).	Perth	Large onshore Project,
LPG Project	Early 1990's	Woodside	Kaiser & Kellogg	Perth	Onshore Project
LNG Train 4	Early 2000's	Woodside	Hatch, Clough, KBR & JGC	Perth	Large onshore Project,
LNG Train 5	2004	Woodside	Foster Wheeler (F.W.) & Worley Parsons (W.P.) known as (PJV)	London *	Large onshore Project,
Pluto LNG Train 1	2006	Woodside	F.W. & W.P. (PJV)	London *	Very large Project
Pluto LNG Train 2 & 3 (FEED ONLY)	2008	Woodside	F.W. & W.P. (PJV) and K.B.R.	London (no work in Perth)	Large onshore Project,
Gorgon LNG (Barrow Island)	2008	Chevron & Texaco	Kellogg Brown & Root (KBR)	Approx. split:- London = 60% Jakarta =10% Singapore = 20% Perth * = 5%	Massive onshore & offshore Project.
Wheatstone offshore platform. Wheatstone train 1 & 2	2009	Chevron	Technip Bechtel	Houston, Perth & Kuala Lumpur Houston	Offshore Project. Very large onshore Project.
Ichthys Field including LNG Trains	2008	Inpex	JGC/KBR	Yokohama *	Very large Project
PNG LNG facilities (FEED ONLY)	2009	Exxon Mobil	Chiyoda & JGC	Japan	Very large Project multiple sites
PNG LNG (Hides facility) FEED ONLY	2010	Exxon Mobil	CBI/ Clough	Perth *	Smaller facility
Macedon Gas Field Project (FEED ONLY)	2010	BHP Billiton	Worley Parsons	Houston	Offshore Project
Browse Onshore FEED Offshore FEED	2010	Woodside	Bechtel Flour McDermotts JV	Houston Houston	Massive onshore & offshore project
Prelude FEED	2011	Shell	Technip	Paris & Kuala Lumpur	Large FLNG Plant

* **Denotes: Minor design engineering conducted in Perth**[17]**.**

[17]Information courtesy of APESMA, information available from the following.
JGC Corporation, *Australia LNG Project*, Available http://www.jgc.co.jp/en/02bisdmn/03lng/exp_australia.html. Last accessed October 3, 2012;
KBR Inc, *North West Shelf - Karratha Western Australia,* Available http://www.kbr.com/Projects/North-West-Shelf/North-West-Shelf-Profile.pdf . Last accessed October 3, 2012;
Woodside Petroleum Ltd, *North West Shelf Project*, Available http://www.woodside.com.au/our-business/north-west-shelf/Pages/default.aspx . Last accessed October 3, 2012;

Western Australia's Future in LNG

Although many of the major LNG projects in this state are well beyond the FEED and detailed design stages of their foundation development these projects will more than likely be expanded in future years. The addition of extra trains to increase capacity will continue as demand for gas from Asia increases. This will provide an opportunity for local engineering design firms to engage in joint ventures and gain valuable experience as part of the design team for expansions projects on LNG plants.

An expansion project which involves the addition of extra trains to a project provides a great opportunity for local engineering firms to be engaged in the design and construction phases. An expansion project requiring the additional of another train generally involves duplication of the design of an existing train whilst being mindful of the need to tie it into existing structures on site. The design phase of duplication work provides opportunities for local engineers to gain valuable experience, develop their skills and improve their LNG engineering capabilities to position them well for future opportunities.

Opportunities in Operation Services

Local engineering firms should also be mindful that a significant level of the Greenfield LNG design opportunities in Western Australia have already passed and therefore target the large contracts for operational services and asset support. The contracts for sustaining these mega-projects are substantial and provide a great opportunity for local engineering companies to enter the LNG market and develop their capability and capacity. These services, ensuring that LNG plants continue to operate safely and efficiently once they enter their production stage will continue to be required for decades to come. Major upgrades, de-bottlenecking and maintenance projects and support services to sustain assets and improve business performance of brownfield operations provide a great opportunity for many local firms to gain valuable LNG experience and begin to develop acclaim as reputable LNG engineering service providers.

No plant is ever designed perfectly and there will be a continuing demand for upgrades to improve efficiencies and rectification work as the plant enters its production lifespan. Because most of this

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Clough, *Woodside LNG Expansion Phase 4*. Available: http://www.clough.com.au/images/stories/projects/Woodside_LNG_Expansion_Phase_4_OG105c.pdf Last accessed October 3 2012;
Hatch, *Legacy Project: LNG Train-4 Expansion Project*. Available: http://www.hatch.ca/oil_gas/projects/lng_train4.htm. Last accessed October 3 2012;
Foster Wheeler AG, *Leaders in LNG,* Available: http://www.fwc.com/publications/pdf/LNG%20brochure.pdf. Last accessed October 3, 2012;
Technip, *Press Releases – Contracts*, 'Technip Samsung Consortium to start detailed design and construction of Shell's innovative FLNG facility', May 30 2011. Available: Technip.com. Last accessed October 3, 2012;
Bechtel Corporation, *The Bechtel Report*, 'Oil Gas & Chemicals Business Review' 2012. Available: http://www.bechtel.com/assets/annual_report2012/oil_gas_chemical.htm. Last accessed October 3, 2012.

work needs to be conducted onsite or needs to at the least have an onsite presence to ensure the engineering work links in to the existing structures, it is in the best interests of the plant that project proponents have a highly qualified local engineering market to call upon with experience in LNG engineering.

When locally based engineering firms have close relationships with project proponents they have a greater opportunity to collaborate and assist one another to realise innovation and technology goals. Having local engineers and local engineering companies positioned to realise innovative future opportunities is important for Western Australia's strategic future if we wish to remain a highly developed high-income country. Recent engineering opportunities surrounding remote mining operations are an example where local engineering firms can position their business to take advantage of cutting edge technologies and the new business prospects they bring.

The remote and inhospitable locations of current and future LNG operations in Western Australia make it both expensive and difficult to sustain a large workforce onsite. These difficulties and the pressure to improve productivity through technology and innovation have led to an emerging trend towards the implementation of remote operations. Remote operated systems and machinery have the potential to have a significant impact upon both upstream and downstream operations. This has to be on the agenda of engineering firms in their future pathways. These remotely operated centres of control and the use of remotely controlled machinery will increasingly be integrated into large EPCM and engineering service contracts. If they are to remain competitive, engineering firms must be able to incorporate and design these technologies into their future work.

It is important that local engineering firms and the wider Western Australian economy maximises the opportunities that our resource wealth delivers. With unprecedented economic growth coming from Asia has come a far greater level of international competition in our region. It is vital that Western Australia's collective knowledge and skills remain ahead of new competitors and to ensure the local economy continues to grow. Investing in technology and skills helps to ensure that local firms are well placed to partner with project proponents and develop strong relationships that help them innovate and realise their future technological goals whilst reducing costs, adding overall project value and improving asset performance.

The State and Federal Governments have a role to play in driving innovation and providing the economic conditions that allows businesses to function efficiently. Both levels of government should work together to develop a detailed business case 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. Government should focus upon supporting innovation and helping innovative companies to access all available assistance that our Universities and other education and training providers have to offer - helping to develop Perth as an internationally recognised engineering centre of excellence.

Current and Future Opportunities

PROJECTS UNDER CONSTRUCTION INVESTMENT[18]

	$US billions	Trains	ISSUES
Chevron - Gorgon	52[19]	3	Costs and schedule under review
Chevron -Wheatstone	29	2	On target
*Shell -Prelude FLNG	10+	1	On target
Inpex - Ichthys	34	2	On target
BG Group - QCLNG	20	2	$US5 billion cost increase
Santos - GLNG	16	2	$US2.5 billion cost increase
Origin Energy - APLNG	20	1	On target

PROJECTS PLANNED/UNDER CONSIDERATION

	Trains	ISSUES
Woodside -Pluto 2&3	2	seeking gas from 3rd parties
Chevron -Gorgon Train 4&5	2	
Chevron - Wheatstone 3-5	3	
Woodside - Browse LNG	3	
*GDF Suez - Bonaparte FLNG	1	
*Woodside - Sunrise FLNG	1	
*PTTEP – Cash Maple FLNG	1	
Timor Sea LNG	1	
BG Group - QCLNG Trains 3-4	2	
Origin Energy - APLNG Trains 2-4	3	

BLUE – denotes project based onshore in Western Australia

* - Denotes FLNG (Floating Liquefied Natural Gas) in Federal Government controlled waters

Note: Prelude (Browse Basin, 475km north-northeast of Broome) is based off the Western Australian coast but will have no onshore presence. This limits the influence that the Western Australian Government can exert upon the project.

[18] Bureau of Resources and Energy Economics, *Gas Market Report July 2012*, Australian Government Bureau of Resources and Energy Economics, July 2012.

[19] Chevron updated their Gorgon project budget to $52 billion (AUS) in December 2012.

FLNG

In the future many gas fields that previously would have seemed inaccessible or were not economically feasible will begin to be opened up through FLNG technology. FLNG technology is currently being developed to allow for an LNG process train to be designed on-board a floating platform anchored at sea above a gas drilling site, thereby eliminating the need to run pipelines to an onshore processing terminal. This type of project has never been attempted before with the Shell 'Prelude' project to be anchored off the coast of Western Australia set to become the world's first[20].

Due to the nature of such projects they will have no major footprint on or connection with the Western Australian mainland. With no onshore construction needed this technology will drastically affect the levels of local content produced by the local Australian workforce. Not only will the entire design and procurement of the project occur overseas but the entire construction phase as well. There is also the potential that these FLNG platforms will be crewed by a foreign workforce if they are deemed to be outside Australia's migration zone[21].

What we may see with the development of FLNG technology is that Western Australia no longer just misses out on engineering design and procurement work, there is potential for the LNG train to be designed, built and constructed offshore and simply towed to the waters off the Western Australian coast. Australian engineers and Perth based companies will no longer have an advantage in providing the operational support to these projects over their 25 year lifespan[22] and engineers from around the world may be brought in to provide operational maintenance support.

Unless Western Australian engineers can be further engaged at the earliest design stages of future FLNG projects in our region or find specific niches to service new technologies associated with FLNG then local engineers may find their skills redundant in this new phase of LNG development. If Western Australian engineers can't even design the current plants that are being built in Western Australia they will have little hope of being able to compete with engineering hubs overseas to design future FLNG structures around the world.

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[20] Shell Company of Australia Limited, *Prelude FLNG - An Overview*, Available: http://www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/prelude_flng/overview/. Last accessed October 3, 2012.

[21] In the Allseas case the court held that the Chevron contracted company Allseas was able to employ a foreign workforce without applying for 457 Visa's for work done that was not connected to the Australian mainland. There is scope for this to potentially happen in the future. The Federal Government has flagged its intentions to make changes to the Legislation to prevent this from happening however this is yet to be seen and may become more difficult as more and more future contracts and investment decisions are entered into. *Allseas Construction S.A. v Minister for Immigration and Citizenship* [2010] FCA 529.

[22] It will remain permanently moored at the location for around 25 years before needing to dock for inspection and overhaul.
Shell Company of Australia Limited, Prelude FLNG - An Overview, Available: http://www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/prelude_flng/overview/. Last accessed October 3, 2012.

Future FLNG projects

Shell Prelude

Shell's Prelude FLNG project could see local content falling to its lowest levels and the ability of the local engineering industry to compete to win LNG design contracts almost disappear.

Shell has signed contracts with the French Engineering firm Technip to design their Prelude project; and Samsung Heavy Industries to build and construct the ship and its LNG processing facility. The project is intended to have a production capacity of 3.6 Mtpa of LNG[23]. Shell's Prelude is scheduled to be the biggest FLNG project currently under consideration[24] yet even still is far smaller than the current onshore developments currently underway in Western Australia.

The option of using FLNG technology to process gas from the Browse Basin rather than continuing with the James Price Point model currently under investigation by Shell's Browse partner Woodside has been discussed in local media reports, however what must be taken into consideration is the substantial difference in capacity of the two projects. The onshore LNG plant that is currently proposed at James Price Point would cater for 12 Mtpa of LNG[25] compared to Shell's prelude capacity of 3.6 Mtpa. Any talk of substituting FLNG for some of the larger gas field developments is probably not realistic at this stage however if Prelude is successful then the option of multiple FLNG structures may become a more attractive option for processing Browse gas.

If future developments in the LNG industry proceed towards more small FLNG projects over larger onshore projects to extract and process gas in our region, Western Australia's local industry will have little involvement in the future. Ships will be designed, built and constructed overseas and if this occurs then there is a much greater chance these facilities can be maintained by companies and workforces with no significant presence in Western Australia.

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[23] Ibid.

[24] Proposed FLNG projects around the world are much smaller than Shell's Prelude. Such projects include

- Petronas FLNG – 1.2 Mtpa
- Petrobras FLNG – 2.7 Mtpa
- Bonaparte FLNG (GDF Suez & Santos) – 2 Mtpa

PETRONAS, *Floating LNG Facility*, Available: http://www.petronas.com.my/our-business/gas-power/wgc/Pages/Floating-LNG-Facility-.aspx . Last accessed October 3, 2012;
GDF Suez, *Bonaparte FLNG*, Available: http://www.gdfsuez.com/wp-content/uploads/2012/05/bonaparte-uk.pdf . Last accessed October 3, 2012;
Technip, *Floating LNG*, Available: http://www.technip.com/sites/default/files/technip/publications/attachments/FloatingLNG_WEB.pdf . Last accessed October 3, 2012.

[25] Project Connect, *Browse LNG Development*, Available: http://www.projectconnect.com.au/Project_Details.asp?PID=372. Accessed October 9 2012.

Overseas Approaches to the Oil and Gas Industry

Different governments around the world have taken a range of approaches towards maximising local opportunities from oil and gas developments to value-add to their economy. Below are a few examples of what measures competitor nations in the oil and gas industry have taken to ensure that local industries have derived maximum benefit. This provides a comparison of the measures taken by other nations and highlights the difficulties that are already faced by project proponents when operating with our international competitors

Examples of Limited Government Intervention

The Western Australian Government can look to successful overseas examples where governments have implemented strategies that have maximised the local opportunities that can be derived from major resource projects and help local industries to become stronger and more competitive. Government has a role to play and the following examples demonstrate how this can be achieved without contravening international free trade agreements while still allowing business the flexibility to make its own decisions.

The underlying purpose of these measures has been to increase the quality and international competitiveness of local industry which helps to increase levels of local content without having to resort to mandating local content levels and in effect limiting future export opportunities.

Canada

In Canada the Federal and Provincial governments of Newfoundland and Labrador work together in their negotiations with major oil and gas proponents. The governments with relevant jurisdiction set up a board in order to negotiate on their behalf as one single unifying voice.

It is mandated that before exploration or development of an oil field, proponents must obtain approval of the Canada-Newfoundland and Labrador Offshore Petroleum Board and before approval can be given the proponent must submit to the board a detailed benefits plan outlining what the project will provide for the region.

It generally includes:

- The establishment of an office in the Province where a significant amount of decision-making is made;
- That the proponent will consider the training and employment of residents of the province;
- How the proponent will go about considering and engaging local businesses for goods and services;
- What research and development and what education and training will be undertaken in the province;
- That first consideration be given to goods and services produced locally, where they are competitive in terms of fair market price, quality and delivery; and

- Providing training and employment opportunities for disadvantaged individuals or groups and enables businesses owned or operated by them to participate in the supply of goods and services[26].

The Board will not require proponents to enter into contracts that are not competitive and mandates no local content quotas.

Making the initial approval of the project dependent upon the strength of a benefits plan leaves the onus upon the project proponent. From the outset a project proponent must formulate strategies to benefit the local community throughout their project plan. This gives companies the flexibility to develop their own strategies and build a business case that delivers local benefits. It gives business the freedom to make the choices they want without government needing to intervene. Because responsibility is in the hands of the potential project proponent it limits the need for governments to waste time and money making orders and directions along the way, and gives certainty to the project. Having the risk of having approval of the project knocked back by government emphasises the importance of local content and encourages project proponents to work hard from the beginning to plan how they will engage the local community.

Trinidad and Tobago

Trinidad and Tobago has leveraged the local LNG industry to improve its economy significantly and in late 2011 Trinidad and Tobago reached the point where it is no longer considered among the group of developing nations[27]. It has maximised the benefits of its oil and gas resources by developing its local industry and training its workforce so that its economy looks beyond the financial profits generated through resource taxes.

Although not as comparable an economy as Canada is to Australia, Trinidad and Tobago provides a positive example of how Governments can work with project proponents to increase local content and create opportunities to develop and diversify local industry. The Trinidad and Tobago Government has been active in promoting opportunities for local business to enter into joint ventures with larger international companies to ensure technology and skills transfers occur and to increase local engineering and fabrication capabilities and capacity.

BP Trinidad and Tobago (BPTT) is the nation's leading oil and gas producer and has committed to support local capacity development to meet its own upstream service needs. Rather than engaging established suppliers in Louisiana BPTT considered the design and construction of its platforms to be

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[26] Department of State Development & Department of Commerce, Local Content Report May 2011, Government of Western Australia, May 2011.

[27] Development Assistance Committee of the OECD, *DAC list of Official Development Assistance Recipients 2009*, The Organisation for Economic Co-operation and Development, 2009;
Development Assistance Committee of the OECD, *DAC list of Official Development Assistance Recipients 2012*, The Organisation for Economic Co-operation and Development, January 2012.
T&T was left of the list of developing nations for the first time in late 2011.

valuable opportunities for building competitive local engineering and fabrication capacities.[28]. BPTT had a premium cost in pursuing local design and fabrication however they determined that in the long term this would benefit the company by creating a skilled and competitive local industry better placed to service the LNG industry in Trinidad and Tobago in the long term[29]. This had the added benefit of increasing the company's engagement with the local community and improving relations with local key stakeholders.

Joint ventures were formed for the purpose of engineering and construction management with the structure of the joint venture being important to facilitate the transfer of technology, knowledge and skills between foreign and local partners.[30] This had led to the establishment of an efficient local supply chain that will provide savings for project proponents in the future as production expands.

This is an example of a proactive project proponent taking the lead and working with local industry to identify specific niches where the local market can be engaged in a challenging, meaningful and rewarding way.

Examples of Strong Government Intervention

The argument that policies advocating for stronger levels of engagement with local industry threaten the likelihood of future investment in Western Australia's oil and gas industry should be treated with a level of scepticism when compared to the strong interventionist policies of many of our international competitor nations. Western Australia provides a long-term, reliable source of gas with low political risk. Proximity to the world's largest LNG markets in Japan and South Korea as well as the booming economies of China and India make Western Australia an attractive location for future energy supply. What is proposed herein is modest when compared to many international examples.

Other oil and gas producing countries have put in place far more onerous local operating conditions for foreign companies to be able to extract their resources. Oil and gas proponents have become well-adapted to dealing with many stringent local content regulations that are imposed in different locations around the world.

Brazil

Brazilian oil and gas developments are dominated by the majority state-owned energy giant Petrobras. The Brazilian Government has legislated that Petrobras be given sole operator status and

[28] BP plc, *The Cannonball Story*, Available at: http://www.bp.com/sectiongenericarticle.do?categoryId=2012450&contentId=7044640 . Last accessed October 3 2012.
[29] Holly Wise & Shtylla Sokol, 2007. 'The Role of the Extractive Sector in Expanding Economic Opportunity'. Corporate Social Responsibility Initiative, [Online]. 18, 25-27. Available at: http://www.hks.harvard.edu/m-rcbg/CSRI/publications/report_18_EO%20Extractives%20Final.pdf Last accessed 3 October, 2012.
[30] IPIECA, *Local Content Strategy: A guidance document for the oil and gas industry*, Social Responsibility 2011. IPIECA publication October 2011.

a minimum 30% stake on all new "pre-salt" oil and gas reserves found off Brazil's coast[31]. Petrobras therefore is the dominant proponent in Brazil with control over a majority of exploratory blocks. Under Brazil's current regulatory framework, local content commitment is one of the judgment criteria for awarded exploration permits to proponents. Bidding is completed over a number of rounds with later rounds having a mandated minimum local content requirement and a greater weighting in favour of those bids with higher local content levels. [32]
Petrobras itself has a local procurement plan requiring 55% to 65% local content for the general construction of drilling rigs, and 20% to 40% domestic content policy for drilling equipment[33] which sets a high standard for foreign project proponents to compete against.

Nigeria

The Nigerian government has a policy that sets a target of 70% local content requirement for all oil and gas projects. The *Oil and Gas Industry Content Development Act* was enacted in 2010 with the aim of increasing the minimum level of local content to be used in oil and gas production and services from 45% to 70%[34]. There are also many other specific requirements including that Nigerian business and labour be used and minimum requirements for the amount of local materials to be used on the project. All parts of a project should involve Nigerians and if Nigerians do not have sufficient skills to fill these roles then the proponent must put in place training programs to develop the local skill base[35].

There is criticism that the Nigerian model is too onerous and that high levels of corruption mean that many of these rules are not complied with; however it highlights the difficulties faced by proponents in doing business in Nigeria and the potential for government to intervene and change the conditions as it sees fit.

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[31] Bureau of Economic, Energy and Business Affairs, *2011 Investment Climate Statement – Brazil*, United States Department of State, March 2011, Available at: http://www.state.gov/e/eb/rls/othr/ics/2011/157245.htm . Last accessed October 3, 2012.
[32] Heller Redo Barroso & Marcos Macedo, *Local Content in Brazilian Oil Industry,* Heller Redo Barrosso Associates. Available at: http://www.hrblaw.com.br/files/local_content_in_brazilian_oil_industry.pdf Last Accessed January 25, 2013.
[33] Tim Haïdar, Oil and Gas IQ, *The Metals and Minerals Sector: An Underexplored Gold Mine For Local Content?* IQPC January 2011, Available at: http://www.oilandgasiq.com/oil-drilling-gas-drilling-development/articles/the-metals-and-minerals-sector-a-gold-mine-for-loc/ . Last accessed October 3 2012.
[34]Department of State Development & Department of Commerce, Local Content Report May 2011, Government of Western Australia, May 2011.
[35] Bureau of Economic, Energy and Business Affairs, 2011 Investment Climate Statement – Nigeria, United States Department of State, March 2011, Available at: http://www.state.gov/e/eb/rls/othr/ics/2011/157337.htm . Last accessed October 4, 2012.

Russia

Russia has the largest natural gas reserves in the world and is the second-largest producer of natural gas[36]. The industry in Russia is dominated by Gazprom the majority state owned gas company.

In Russia the oil and gas industry is heavily politicised making outside investment difficult. Shell and BP have both faced significant problems conducting their business in the country[37]. Because the Russian state has control of the oil and gas industry the local workforce and suppliers are favoured in most contracts ensuring national interest is the bottom line[38]. In all major projects foreign companies are engaged if they have a specific area of expertise however they are expected to assist in skills transfers to the local market and allow for local companies to take over in the future. Foreign companies wishing to extract gas from Russia must make significant overtures to the Russian State to be able to begin developments and continue their operations. This difficult operating environment where foreign investment is heavily scrutinised contrasts with Australia's relatively welcoming environment.

[36] U.S energy Information Administration, *Country Analysis Brief – Russia*, U.S. Department of Energy, September 2012. P10-14. Available at: http://www.eia.gov/countries/analysisbriefs/Russia/russia.pdf . Last accessed October 3 2012.
[37] Ibid., p6
[38] Department of State Development & Department of Commerce, Local Content Report May 2011, Government of Western Australia, May 2011.

Strategies for the Future

The following recommendations are intended to provide government with policy settings that will assist the local engineering industry to remain competitive and at the same time continuing to make Western Australia an attractive place for resource companies to invest.

When resource companies seek approvals to commence a major gas project the Western Australian Government holds a strong position in which to leverage outcomes in the best interests of the State's long term future. State Agreement Acts are usually formed due to the size and nature of these major projects and they can be modified or reworked in conjunction with project proponents for major expansion projects. This is the important stage when governments have the greatest opportunities to leverage investment by these firms.

During the formation of a State Agreement the Western Australian Government should work to make sure a number of commitments are made to engage with the local engineering industry before a resource development can begin. These commitments should not unnecessarily hinder the progress of a major project however they will begin to alter the approach major project proponents take in their procurement and contractual arrangements. This will help to deliver long term benefits for major project proponents by providing them with a qualified and competent workforce capable of delivering projects to the highest standards. Setting clearly defined goals during the formation of a State Agreement will provide certainty by outlining a clear strategy to progress the engagement and skills development of the local engineering industry so they can competitively tender for work.

Government's role will be to assist business by listening to industry concerns and ensuring that the correct taxation and regulatory settings are in place to encourage investment. These measures will help to provide the right conditions for an engineering centre of excellence to be developed that will build the state's engineering capacity and provide the opportunity for Western Australia to increase the export of its intellectual capital.

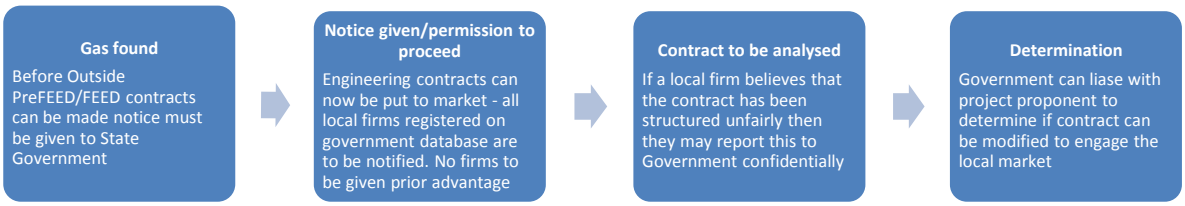
Opportunities to participate

Although many Western Australian based engineering firms have been involved in major gas projects in recent years there has been a lack of engagement in the process design work of LNG process trains. Whilst the design of LNG process trains may present the most lucrative opportunity for local engineering skills development it is important for Western Australia's future that local engineering firms are provided every opportunity to win the long-term operational service contracts that will help to sustain and develop our LNG skill base and position local firms well for future design opportunities.

It is important that the Western Australian government leverage the current growth in LNG developments to create lasting engineering and design capabilities that can service both the growing domestic and international LNG sectors, leaving a sustainable industry for the future.

Before a Greenfield project, or any major maintenance, upgrade or de-bottlenecking project begins commitments must be sought from the project proponents that contracts will be structured in a way that does not preclude the local market in either a direct or indirect way such as making contracts too large or by tailoring work packages to suit a particular foreign based and established engineering firm.

An undertaking should be agreed with proponents that all future contracts put to the market must be in a form and manner that does not unfairly hinder the local market. In doing so they must afford the local engineering market a strong and realistic chance of winning the work. If a project proponent believes the local market is unable to provide the engineering services required then written application to the Minister will be necessary outlining specific reasons why local market is unable to provide the contract that is required. This will help government to plan and allocate resources in order to increase the capacity and capabilities of the local market in order to meet future opportunities.



Early planning stages of an LND development where the local engineering market should be engaged

A practical expression of this may be that work packages have to be broken down, or restructuring what is asked for in the contract. Simply stating that a project is too large, too complex or too different to what the local engineering market has or can provide is not sufficient. If the local market truly can't tender for work competitively project proponents need to be able to show what specific improvements need to be made to address their shortfalls. Moving the goalposts after each and every contract will not be acceptable. Engineering contractors should have a right under the relevant State agreement to show what they can provide to a project proponent and if a local contractor can't meet the project proponent's specific requirements clear directions should be given to the market so that joint ventures may be formed with local or international partners to make up for any shortfall.

Recommendation

1. *That in future State Agreement Acts the Western Australian Government seeks commitments that the structure and size of future contracts do not directly or indirectly preclude the involvement of the local engineering market.*

Leveraging projects for a lasting dividend

Government should always be wary of making the costs of doing business in Western Australia higher, the aim of developing a higher number of relevantly skilled people should be to help drive down costs in the long term. The goal should be to increase the pool of available skills in Western Australia to benefit all sectors of the economy. For that reason government must ensure that companies that invest in developing engineering skills to meet future demand in Western Australia's gas industry are not disadvantaged.

Mandating local content quotas will not benefit the long term sustainability of Western Australia's LNG engineering capability. Incentives should be provided to encourage project proponents to invest in local engineering services to actively develop high-value skills for the local industries long term future. Government and industry together should aim to foster highly competitive high-end skills that can be exported to international markets in the future.

All long term and major contracts will be required to have a skills development component outlining a clear plan for the development of engineering expertise in particular for engineering graduates. Local companies should not be expected to carry the burden of training, to provide for future developments whilst overseas based competitors contribute nothing towards building Western Australia's intellectual and skill capital. Both State and Federal government need to be aware of the long term dividend that skills development provides and must help make training of university graduates a simple and more cost effective process for local industry.

There is considerable public comment regarding the lack of skilled labour in the resource industry in Australia yet not enough has been done to address future needs. Skilled migration is a short term and expensive fix and will become more and more difficult with many specific engineering skills being in high demand internationally. It is a far better long term option for Government to take leadership and examine what industry needs for the future. Programs as well as targeted funding need to be directed towards ensuring Western Australia produces relevant skills that are able to sustain the operation of an increasing number of LNG plants in Western Australia over the coming decades.

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 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.

The Federal and State Governments must work together with industry to limit the costs of training and development, and to facilitate more efficient and effective ways to provide future skill requirements. Both levels of government will need to provide infrastructure and other incentives for training through cadetships and bursaries. These matters are currently before the Federal Government in their response to the recent Senate Inquiry on skills shortages in engineering.

A formal government led system would provide a clear avenue for industry to communicate what skills are required and training can be tailored to meet industry needs for the future. This will benefit industry by limiting risks, costs and time lost through their investment in skills development. An improved pipeline of engineers over the long-term will lower costs for employers and proponents in Western Australian by increasing the available pool of labour.

These education and training measures should be integrated with the proposal to make Western Australia an Engineering Centre of Excellence.

Recommendation

2. *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.*
3. *The Western Australian Government should work with the Commonwealth to ensure that all available government funding and assistance is clearly communicated to companies before their skills development and training plan is submitted in order to support the development of a training plan.*

Registration of engineers

Engineers hold a position of great responsibility in our society so it is essential that their work is always completed to the highest and safest standards. It is neither acceptable nor legal for poor and hazardous engineering work to be completed in this State, however there is no legal regulatory system to prevent the underqualified or inexperienced from carrying out work that may put others in jeopardy.

Many professions requiring high levels of skill and education - such as medical practitioners and lawyers - that also come with a considerable deal of responsibility are regulated by legislation identifying certain defined criteria needing to be met before they may be legally registered to perform those duties. This however does not apply to engineers. Currently there is no uniform regulatory regime covering engineers in Australia with Queensland being the only State that requires all engineers to be registered if offering or providing engineering services.

The government should ensure any registration system is regulated independent of any one organisation and the system is straightforward and affordable to prevent an unfair cost and time burden being placed on people in the engineering profession, engineering organisations and the community.

Engineers are required to provide the safety and assurances that consumers of engineering services and the wider community rely upon. With the current skill shortages being experienced in Western Australia companies are increasingly turning to engineers who are not trained in Australia and hence unfamiliar with our unique regulatory environment. A legislated registration scheme would also limit the amount of time and resources needed to be spent by companies investigating the suitability of potential engineering service providers. Under a registration system the responsibility would then be for engineering service providers to ensure they meet the legislative requirements to work on projects in Western Australia. Statutory registration gives project proponents a straightforward and simple way of determining the qualifications and competency level of engineering services by providing a standardised measurement of the education and experience levels of an individual. This will help keep cost and time delays down by eliminating the need to make considerable investigations and judgments upon the qualifications of potential candidates whilst lowering the overall risk of the project.

Major LNG developments are large projects requiring huge workforces. Exposing these workforces to potential risks is not only unacceptable to the Australian public it is illegal. Although a registration system can provide no guarantees to safety and risks from human error it will eliminate the risk of engineering services being provided by engineers without adequate qualifications.

Australia has been relatively lucky when it comes to major industrial accidents and disasters when compared to many other countries however we have not been immune. Recent examples of asbestos being found in imported pre-fabricated buildings on LNG projects[39] as well as major industrial disasters such as the Varanus Island, Montara and Esso Longford gas explosion show that when engineering faults are made they can have catastrophic consequences. Injury and the loss of life are always a major fear but poor engineering can also be disastrous to companies through the immense costs associated with accidents, delays, inefficient designs and poor execution and maintenance of operations. A strong regulatory system would improve the standards that can be expected in Western Australian projects.

Western Australia has recently been reliant on overseas engineers for specific skills to fill areas of critical need. A registration scheme could assist by easing assessment mechanisms required for the free flow of labour between jurisdictions. Figures released by the Department of Foreign Affairs and Trade show a 42.5 % growth in the importation of engineering services over the last five years with imports substantially outstripping exports of these services[40]. Given the two-paced nature of Australia's economy and that Western Australian growth has been out-stripping that in the rest of the nation, it would seem sensible to assume much of this growth is being driven by our resource sector. A registration scheme would serve to aid the mobility of engineering labour.

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[39] William Rollo, 2012, 'Row over asbestos found at LNG plant' *ABC AM,* 3 August, Available at: http://www.abc.net.au/news/2012-08-01/row-over-asbestos-claims-at-lng-plant/4168484. Last accessed 3 October 2012.

[40] Department of Foreign Affairs and Trade. *Trade in Services Australia 2011. http://www.dfat.gov.au/publications/stats-pubs/trade-in-services-australia-2011.pdf.* Last accessed 21 August 2012.

Importantly for engineers in Western Australia, registration gives credit for the important role they play in our society and helps to increase the esteem in which the engineering profession is held. It allows individual engineers to receive the formal acknowledgment that their qualifications, talents and skills deserve and encourages the brightest and best talents to pursue the recognition and prestige that comes with a formally accredited profession.

Recommendation

4. *That the Western Australian Government introduces legislation that requires the registration of any engineer wishing to provide engineering services where those services impact upon public health and safety. To enable this, legislation should be drafted under which professionals working in these areas are identified as needing to register. In doing so the Western Australian Government should contemplate the possibility of a national registration scheme in the future and implement its own scheme with Federal harmonisation in mind.*

Role of Government

Financial incentives should be examined by both State and Federal Governments to encourage Western Australian engineering companies to compete on more complex and lucrative projects. When doing so, it should be borne in mind that taxation will otherwise be lost if projects are designed offshore so it will not affect the States bottom line. Tax credits should be used to incentivise operators to engage local engineering providers rather than mandate local content quotas that will do nothing to help build our skills base and enhance our overall engineering capabilities.

The Western Australian Government should lobby the Federal government to implement an income tax break or incentive for workers who must spend significant time working in the State's remote northwest. The costs of living in the Pilbara have risen sharply in recent years due to high rental costs and the difficulties that come with the logistical issues the region faces when getting supplies. By implementing a tax break or incentive it would help to bring overall project labour costs down and would make Western Australia's northwest a more attractive place to invest.

Regulatory assistance should also be offered to major project proponents and locally based contractors. Cutting red tape can be of huge assistance to major projects local, state and federal authorities should work together to ensure that the duplication of approval processes are minimised where possible. The Western Australian Government should work with industry to identify where locally based work can be streamlined ahead of offshore designed projects. A locally designed project should not have to go through such stringent compliance checks as that of an overseas

designed project simply because local engineers know and have considerable experience working within both State and Federal regulatory requirements. Western Australian engineers will also have to declare as part of their registration that they are competent and have proficiency within the unique local regulatory environment. Overseas designed projects however will still need further analysis and scrutiny to ensure compliance with Australian standards.

Streamlining the local engineering market will make their local knowledge and experience a more marketable product, and will help bring down costs. A company that can show Western Australian registered engineers leading their project should have their designs streamlined through a number of approvals processes due to the fact that their competency with Western Australian standards and regulations can be evidenced through their engineering registration.

Both levels of government should look at developing a clear line of dialogue between government and the local engineering industry. Too often local engineers and engineering companies do not communicate their problems and therefore do not usually suggest potential ways to remedy issues affecting their competitiveness. Setting up an open dialogue between engineers and government that could be facilitated through APESMA with the potential for quarterly meetings between an industry working group and the Department of Commerce will let the local engineering market feel more involved in government decision making and allow for realistic goals to be achieved in a timely manner.

Recommendations

5. *That the Western Australian Government works with industry and the Federal Government to provide financial assistance and tax breaks to help Western Australian based engineering companies remain competitive in the context of a high Australian dollar and a fragile international economic climate.*
6. *That the Western Australian Government works with industry to simplify the regulatory and approval system through greater collaboration between Federal, State and Local government to remove duplications across different jurisdictions and improve its efficiency.*
7. *That the Western Australian Government set up streamlined approval process for engineering design work that has been completed in Western Australia by Western Australian registered engineers.*
8. *That the Western Australian Government sets up a clear line of dialogue between the local engineering industry and the Department of Commerce with quarterly meetings to discuss what measures can be taken to assist local industry in winning more work on oil and gas projects.*

Establishing stronger relationships

The market for engineering design of new LNG plants has been dominated by large overseas based multinational companies who have often had little permanent presence in Western Australia. The

opportunities created from Western Australia's abundant gas resources have delivered work and thereby fostered skills and economies of scale in overseas engineering centres giving them a competitive advantage in the booming LNG market[41]. This lost opportunity has also made it difficult for local engineers to obtain the relevant experience and skills needed for ongoing work on existing LNG plants. With a large proportion of design engineering work being sent overseas, engineers wanting to be involved in LNG design are enticed to leave our shores in the pursuit of better career opportunities, thereby exacerbating Western Australia's skills shortage. This does nothing to assist Australia in advancing its technology. LNG developments provide a vital opportunity for Australian engineers and companies to gain experience and improve efficiencies in one of the world's most cutting edge industries.

Local firms that are not already a part of preferred tender lists face an uphill battle to establish relationships that will get their foot in the door for future opportunities. Cultural synergies between project proponents and engineering firms that have worked with one another before in different locations around the world have given many offshore based engineering firms an edge over their Western Australian based competitors. If Australia is to thrive in a post mining boom economy our engineers need to gain experience in the most complex engineering design. For Australia to be able to meet its technology goals and advance its engineering proficiency the design of our resource projects as well as future upgrades, operational services and asset support need to involve the use of engineering offices located in Australia.[42] This does not mean all work needs to be done in Perth however a significant level of involvement with Perth design offices would be expected.

To harness the full opportunity of the LNG resource sector the Western Australian Government should encourage project proponents to engage local engineering firms at the earliest stages of a project. This does not mean that it is mandated that the local workforce be solely responsible for any particular part or stage of a project, rather that the local market is actively encouraged to bid for all aspects of a project. This may entail the pursuit of joint ventures with local or international partners, in which a considerable level of responsibility and challenges are delegated to a Perth office. Most importantly however, it opens up the opportunity for local firms to fairly and competitively bid for future work because they have relevant and recent LNG engineering experience

Project proponents should be required to hold open pre-qualification meetings in which all major engineering design companies based in Perth are invited to be briefed upon upcoming opportunities so that they may prepare their business for future demand. This may also provide an opportunity for different firms to develop joint ventures together or seek out overseas based partners with specialist skills and experience that will assist them in winning work.

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[41] Local industry participation has fallen from a peak of 72% for train 4 of Woodside's North West Shelf project to an estimated 45% to 55% for the Pluto and Gorgon projects.
Department of State Development & Department of Commerce, *Local Content Report May 2011,* Government of Western Australia, May 2011.

[42] K Brancher, *Countering the Loss of Engineering Design Opportunities available on Australia's 400 Billion of LNG and Mining Projects to Offshore Design Firms*, Engineers Australia – Senior Engineers Group – Technical Seminar, 15 March 2011.

It will be expected that local firms with the capability to provide services be put on preferred tender list unless the project proponent can provide detailed reasons why they shouldn't be considered outlining what improvements or modifications the local market must implement in order to make it on to their preferred tender list. Once the improvements have been made they should then allow a local firm to enter their preferred tender list as soon as practicable. This would require clear and open lines of communication with the local engineering market to ensure improvements are made.

It is then the responsibility of local engineering firms to ensure that their business is well positioned to realise the new and innovative opportunities of the future. This also requires both State and Federal governments working together to help provide the correct economic and policy environments to foster innovation and ensure our local engineering industry can deliver superior LNG solutions. Fostering this environment will help Perth to become a smart hub in the Asian region that will develop into an engineering centre of excellence internationally recognised as leaders in the field of LNG design and operational services.

Recommendations

9. *That if a project proponent wishes to operate in Western Australia then locally based engineering design firms must not be excluded from preferred tender lists. Local firms must be included in discussions surrounding prequalification and if the local market is unable to provide services due to a lack of capacity or capability then project proponents must communicate this clearly to the local market so that measures can be implemented to address shortfalls.*
10. *Both State and Federal Government work together to encourage innovation and the development of key skills required for future demand in the oil and gas industry with a clear focus towards developing highly technical skills and creating the jobs of the future. This would involve funding the development of a business case to develop Perth into a 'smart hub' for the education and training of highly technical engineering services.*

Perth: an Engineering Centre of Excellence

Both State and Federal Governments should work together to establish Perth as an innovation hub for LNG engineering and design. The waters off Western Australia's coast and the surrounding regions will provide gas resources for a number of different types of LNG developments over the coming decades. This region will be the heart of increasing LNG supply through Eastern, Southern and South Eastern Asia. The Western Australian economy should look to provide world class training and development of technical skills that will assist in future projects.

Government can fund research and skills development facilities to provide a highly capable workforce that will be best placed to provide the LNG industries most cutting edge solutions.

Universities should have a greater involvement with LNG gas developers and should tie their research and training to specific industry demands. Research funding should be tied to specific industry outcomes and facilities should be funded and developed with industries concerns in mind.

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.

The establishment of a Government funded high-tech oil and gas focussed research hub that is driven by oil and gas proponents will help to provide opportunities for engineering work outside major project developments and upgrades. Although there are many well established linkages between individual companies and different Universities there needs to be a more detailed and strategic plan put together to formally link both levels of government with oil and gas companies operating in Western Australia, local engineering firms, University engineering schools and their research facilities to ensure that funding is directed in an efficient and effective manner.

Importantly our natural gas resources are finite and once they are gone Western Australia needs to be left with something other than the tax royalties paid along the way. Western Australia is now a net importer of engineering services and this trend has become more pronounced in recent years. The States export of engineering services has seen negative growth since 2010 with the Department of Foreign Affairs and Trade figures showing a 47.9 per cent growth in the import of engineering services over the last five years[43]. An engineering hub provides the opportunity for Perth to become an international centre that can export its intellectual property. High-end skills and quality research leveraged from the current boom in gas developments can obtain lasting dividends for our State, in much the same way as places like Norway and Houston have been able to do in the past.

Tying Western Australia's abundant gas wealth into a higher education centre of engineering excellence will allow our gas to provide more than just tax receipts and create an enduring hub that will attract the brightest and best talents in the world. As with other industry specific hubs around the world the added benefits provided to the local economy will have a multiplier effect - making Perth an internationally recognised engineering hub would encourage collaboration with other related industries and lead to skills transfers as well as a greater level of business development giving the State long term prosperity beyond the life of major gas projects.

[43] Department of Foreign Affairs and Trade. Trade in Services Australia 2011. http://www.dfat.gov.au/publications/stats-pubs/trade-in-services-australia-2011.pdf. Last accessed 17 October 2012.

Western Australia's rich resource wealth has delivered prosperity to our State and the nation for many years, however we must be conscious of the fact that these resources are finite and will one day run out. Western Australia must utilise this current opportunity and begin the necessary planning to establish long lasting and internationally competitive industries that will thrive beyond the current boom and position the State for sustained future growth.

Recommendation

11. *Government, Industry and Universities become far more integrated in their long term approaches to developing engineering capabilities in Perth. This already occurs to some degree in an ad-hoc manner however greater linkages and a more detailed long term strategic plan must be developed.*
12. *The Federal and Western Australian Government work together to establish Perth as an international engineering design hub through the development of an Engineering Centre of Excellence.*

Conclusion

Western Australia's natural resources are a finite resource. International experience – both past and present tells us that governments have sought to set mechanisms whereby the very technical, highly-skilled work that is required in the engineering and design of these projects can be leveraged for the long-term benefit of their nation. Conversely, local consultation tells us that work derived for local firms from our LNG is not deriving maximum benefit for local engineering firms and therefore not assisting in building our innovation capability in Western Australia.

As stated out the outset, we do not propose, nor support, wholesale government intervention or for the Government to act as a caretaker of investment in the state's resources sector. These are the strategies of economies which do not rely on free trade. Our strategy relies on building our services trade capability beyond the current spike in resource sector expenditure.

We must foster collaboration and by these means build excellence in Western Australia. It is a means by which we can diversify our economy, broaden our offer to the world and alter entrenched perceptions.

Our intellectual capital in Western Australia should serve to be enhanced by these measures and will help to make sure that in the future, we will not be known solely as a resources State, but as an innovation State for the LNG sector.

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