SME OPPORTUNITY GUIDE FOR AUSTRALIAN LNG OPERATIONS AND MAINTENANCE CONTRACTING ACTIVITIES

AKROM

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ABOUT AKROM

Akrom is a specialist SCM consultancy business based in WA which focuses upon the development of innovative solutions for the supply chains of enterprises working in the Oil & Gas industry.

Akrom offers high-value supply chain, procurement and contracting consultancy services to help its client base secure best in class solutions to its SCM challenges.

The practice embraces a client-focused and collaborative approach for each engagement, transferring critical knowledge every step of the way.

ABOUT THE AUTHORS

Alistair McGregor is a leading SCM practitioner in his field with over three decades of extensive executive experience leading organisations such as AMEC, Apache Energy, ConocoPhillips, KCA Deutag and Venture Production. He is the winner of the 2006 CIPS award for the best Purchaser-Supplier relationship and the recipient of other professional accolades for his work in Supply Chain Management.

Diego Berazategui is a leading developer of business solutions for the industry and possesses over 12 years international experience in Engineering, Supply Chain Development and Project Management. Diego has undertaken project work for some of the largest Oil & Gas corporations including ConocoPhillips, ENI, Exxon-Mobil, BP, Chevron, Apache Energy and Santos. He is currently the country representative for the Petroleum Industry Data Exchange (PIDX) a global forum for delivering eBusiness standards that facilitate seamless, efficient electronic business within the industry.

For more information, please contact:
Akrom Pty Ltd
Level 24, 77 St Georges Terrace
Perth WA 6000
Australia

Phone: +61 1300 72 10 72
Email: info@akrom.com.au

Website: http://www.akrom.com.au

TABLE OF CONTENTS

SECTION 1 LIST OF EXHIBITS

SECTION 2 TERMINOLOGY

Achilles	A commercial provider of community based registration and prequalification services.
AIPP	Australian Industry Participation Plan
APLNG	Australia Pacific LNG
BOD	Basis of Design
CDI	Carbon Dioxide Injection
CSG	Coal Seam Gas
ICN	Industrial Capability Network
FID	Final Investment Decision
FLNG	Floating LNG
FPS	First Point Supplybase - the Achilles product offering for the Australian oil and gas industry.
FPSO	Floating, Production, Storage and Offloading unit.
GLNG	Santos Gladstone LNG Project
ISN	A commercial provider of community based registration and prequalification services.
LET	Low Emissions Technology
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MTPA	Million Tonnes Per Annum
NWS	North West Shelf
O&M	Operations and Maintenance – the protracted phase in an enterprises lifecycle following on from project completion to final abandonment. It is often measured in decades.
ProjectConnect	An online service designed to list project opportunities and to connect suppliers with new business opportunities.
QGC	Queensland Gas Company
ROM	Rough Order of Magnitude
SCM	Supply Chain Management
SIMP	Social Impact Management Plan
TCF	Trillion Cubic Feet
TJ	Terajoules – a common measure of the energy content in gas.
Train	A process assembly at the heart of an LNG plant which enables the facility to turn Natural Gas into LNG. A typical train consists of equipment for purification and compression and each LNG plant consists of one or more trains.

SECTION 3 INTRODUCTION

Opportunity Guide Brief

This opportunity guide has been commissioned by the Australian Industry Participation Branch of the Department of Industry to examine the procurement and contracting practices relevant to the O&M phase of major LNG projects currently being executed in Australia.

Whilst previous work in this field has concentrated on project opportunities for SME's this guide is intended to focus upon the opportunities emanating from the operations and maintenance budgets of the LNG developers. It attempts to provide specific guidance in the following areas:-

- How LNG O&M opportunities are placed into the market and the methods used by developers to source, bid and make awards.
- How SME capability information is obtained and used.
- What selection and award criteria are used to determine successful participants in competitive processes.
- How Australian SMEs might increase their chances of winning work in the O&M phase.

Economic Background

According to the estimates of Bureau of Resource and Energy Economics, the capital costs associated with LNG projects equate to $2.9 Billion per MTPA (based on Wheatstone). With a total capacity of 60.8 MTPA under development in Australia this puts the total investment value in the region **of $176 Billion** when using the BREE measure.

With the expected completion of the bulk of LNG project investment within the next few years the focus of the industry will inevitably, and by necessity, move towards preparing for the O&M phase of those projects.

This phase will be a dominant feature of the industry for the next 40 years and one which offers Australian enterprises enormous opportunity. It could, by our estimates, result in a range of opportunities of a broadly equivalent value to that of the capital project phase for Australian suppliers and contractors. This will be conducted in an arena particularly suited to local rather than international solutions for the most part.

Preparing For Change

Dealing effectively with this business challenge and shifting focus towards the opportunities that the O&M support phase provides is therefore of significant importance for LNG developers and Australian businesses alike.

Equipping SME's with the knowledge of the strategies being contemplated by LNG operators is increasingly relevant and the timing and method of placement of those opportunities into the market place is now critical. Similarly equipping LNG developers with knowledge about the degree of market preparedness that exists amongst SME's should also be of considerable value so that they are aware of any latent supply bottlenecks and potential shortage and quality issues.

The large scale of additional business volume is easily capable of swamping and overwhelming local capability and this guide is aimed at being of influence in shifting the engagement approaches of local enterprises.

Guide Structure

This guide explores the nature of the opportunities available to Australian SMEs from operations and maintenance requirements of LNG developers and aims to assist SMEs in navigating their way successfully through the competitive processes employed by operators who place their business into the market place.

The guide is therefore structured to look at current Australian LNG operations before going on to examine developments in the pipeline. It seeks to assess the boundaries of the opportunities available and then examines the processes by which those opportunities are placed into the market place. Finally it considers how contract award decisions are made. As the guide considers a somewhat complex procurement process, occasional professional insights from the authors have been highlighted in order to bring greater depth of understanding to the subject.

Key Guidance Points

We have provided 40 key guidance points in this guide with a number of significant observations and findings in the following categories.

- Total opportunity value, dimensions and timing
- Threats and risks of opportunity loss
- Opportunity mapping
- LNG plant supply demands and working practices

Research Methodology

Our research has relied to a large extent on publically available material gathered from developers, key contractors, government and agencies of government, industry associations and representative trade bodies. We have augmented this approach through the professional expertise and knowledge of the authors and through the use of relevant reports and other studies published prior to our own. It is, to the extent that we can reasonably ascertain, correct at the time of writing but is naturally affected by a dynamic and changeable business environment.

In building this opportunity guide we have also aimed to understand the experience of a typical SME in obtaining information about commercial opportunity and have therefore chosen to place a degree of reliance upon some information source types in preference to others (we have for example largely eschewed formal interviews).

These slight dependencies are by design, are freely acknowledged and are an intrinsic part of the brief provided to us which has sought to produce a comprehensive, accurate and influential report in both a resource-efficient and timely manner.

SECTION 4 CURRENT LNG ASSETS

Development History

When considering the nature of future business opportunities it should always be borne in mind that Australia has considerable history in the construction and development of LNG plants. As a consequence of this prior investment there are at present three export facilities in operation.

Enterprise	Plant Location	Operation Start	Installed Capacity	Number of Trains	Plant Operator
NWS	WA	1989	16.3 MTPA	5	Woodside
Bayu-Undan	NT	2006	3.8 MTPA	1	ConocoPhillips
Pluto	WA	2012	4.3 MTPA	1	Woodside

EXHIBIT 4.1: PLANT DEVELOPMENT HISTORY

Operating Budgets

The installed LNG capacity within Australia currently equals **24.4 MTPA** and the commercial opportunities for local enterprises emanating from these plants is already considerable. Recent estimates have predicted an annual expenditure on O&M and development requirements to be in the region of $800 Million for the NWS venture alone which broadly equates to **$49 Million per MTPA** and on that basis an annual estimate of **$1.2 Billion** for current O&M requirements is derived.

We believe this figure to be potentially overstated with regard to some LNG developments for a number of reasons.

Firstly the indication of NWS economic activity includes “development” work which given the maturity of the NWS plant (some of its installed base of equipment dates back 25 years) may be an important component of NWS budget planning but may not be a wholly accurate number to extrapolate from for the rest of the industry. It may also include feedstock gas costs which are an important feature of LNG plant operations in powering the liquefaction process.

Another consideration is that the figure may also encompass budgetary elements that are not open to competition (such as fuel gas) so we have focused upon attempting to obtain other data sets that may be more indicative of actual business opportunity for the present suite of LNG developments. We look at potential opportunity value arising from operational budgets in depth later in this guide.

Focus Reorientation

The scale of future opportunities is explored in more detail in Section 8 but it is unambiguously clear that O&M expenditure on this scale is clearly worth pursuing and changing industry focus into this arena possesses considerable merit.

This is especially relevant considering that this is also a field where Australian sources of supply should do well – that notion is explored more thoroughly in Section 13.

As will be demonstrated later in this guide, a reorientation of effort from securing project orders to addressing O&M potentials is therefore in the interest of the Australian SME community.

Key Guidance

In summary there are a number of key guidelines relating to current LNG operations that we wish to emphasise to potential providers of goods and services:-

- Figures on the value attributed to O&M opportunities emanating from NWS in latest estimates may be overstated.
- NWS budgetary estimates are unlikely to be wholly applicable to other LNG plants because of the unique conditions pertaining to NWS
- It is difficult to be entirely accurate about total opportunity value but with the scale of developments being so prolific that is perhaps a smaller issue than it might otherwise have been.
- Existing operations may find themselves short of attention as supplier focus potentially moves onto new opportunities.

SECTION 5 LNG OPERATIONS

Whilst containing many elements common to the more conventional gas plants found worldwide, LNG operations do possess a number of key differentiators that present distinct challenges to operators.

This section of the guide provides a basic grounding in LNG operations so that those distinctions are better appreciated by the suppliers and contractors wishing to deliver goods and services to this market.

Liquefaction and Compression Process

In an LNG process natural gas is first treated to remove contaminants (such as water, mercury, CO_2 and other substances) before entering the liquefaction section of the plant. The treated gas is then progressively chilled in successively colder heat exchangers that typically use refrigerants particular to each process design to cool the gas. Natural gas liquefies when its temperature is reduced to minus 162°C, at which point it takes up just 1/600th of its original volume. Product leaving the plants LNG trains has changed from a gaseous to a liquid state and is now ready for storage.

LNG Storage

LNG coming out of the heat exchangers is pumped into special insulated storage tanks which are required to hold and contain LNG in order to build volume suitable for shipment to customers. Gases which continually boil out of the LNG as it warms slightly in storage are captured and returned to the process to be re-liquefied.

Storage tanks can be exceptionally large - on the Curtis project for example, each of the two tanks required are 48m high and will have a capacity of 140,000 m^3 which is a volume said to be equivalent to fifty-six Olympic sized swimming pools or five Sydney Opera House concert halls.

LNG storage tanks typically have steel inner containers that can withstand extreme cold and an outer secondary concrete container with pre-stressed walls to prevent leakages. Insulation surrounds the inner containers above, below and around them.

As LNG is stored at near atmospheric pressure this means it is not under pressure in the same way as cylinder gas used for barbecues or motor vehicles for example. LNG storage safety systems also include fire and gas detection system, firewater system and overpressure protection.

Tanks are designed to resist extreme events such as earthquakes, blasts, fires and other impacts and as far as can be ascertained in more than 35 years of industry operation a major tank containment failure has never been reported.

In-tank pumps will transfer the LNG from storage to LNG carriers for onward transportation to market when a cargo is scheduled to be loaded.

Delivery to Market

LNG cargoes are periodically dispatched to market in specialised LNG carriers. As the bulk of exported LNG is used for domestic consumption in overseas markets reliability of delivery is a critical requirement which has its own effect on plant operations. Operators are typically required to guarantee a contractual delivery schedule to satisfy their customer's needs which places pressure on maintenance schedules.

At export terminals LNG is pumped down a dedicated jetty (often at a considerable distance for safety and cargo loading reasons) to waiting LNG carriers. LNG carriers are often built specifically to service the contract requirements for particular plants and may be dedicated to service those plants for a considerable part of their working life.

At receiving terminals the LNG is transferred to storage tanks, re-gasified and shipped via pipeline to domestic users using local distribution systems. Once re-gasified LNG is completely indistinguishable from natural gas.

LNG Technology

The technology required to liquefy gas to produce LNG is highly specialised and subject to intellectual property rights of the developers of that technology. Selection of the optimum technology will play a major part in the reliability and operability of the plant and hence affects operational and contracting needs. The most common processes are:-

- ConocoPhillips Optimized Cascade®
- Air Products Mixed Refrigerant (MRC™)
- Linde Mixed Fluid Cascade (MFCP™)
- Axens Liquefin™
- Shell Double Mixed Refrigerant (DMR™) and Parallel Mixed Refrigerant (PMR™)

Each of the respective technologies offers different O&M challenges.

- The ConocoPhillips process is installed in LNG plants in Alaska, Trinidad, Egypt and Darwin and is designed around a "two-train-in-one" reliability concept with the plant being configured so that equipment with higher maintenance needs (such as gas turbines and compressors) are duplicated, while more reliable components (like fin coolers and heat exchangers) are not.
- Several of the technologies also use proprietary equipment - MRC™ and MFCP™ for example use special licensed heat exchangers that, as a consequence, are sole sourced thus reducing the degree of competitive opportunity.
- Low temperatures operations place particular strains on equipment and pipework.

Quality and Technical Integrity Regime

The ability to generate low temperatures is an inherent part of the LNG liquefaction process and is rightly prized for efficient plant operation. It also has an inherent set of problems associated with it for a number of reasons.

Reliability Requirements ***INSIGHT 1***

Due to the operational difficulties of LNG plant operation and the necessity of meeting cargo deadlines reliable delivery of goods and services from suppliers is of paramount importance and a key driver of business placement. This requirement must be clearly be recognised and addressed by parties competing for work in the O&M phase.

Chief among them is the fact that dramatically reducing the temperature of the gas requires energy and expensive processing equipment (which can account for up to 10% of the Natural Gas entering

the plant which must be burned to provide the energy needed for refrigeration). Although there are ways to make processing more efficient the energy demand remains substantial and the required equipment expensive.

In addition, low temperature processing requires substantial investment in special materials. Pipe and pipework operating at ambient temperature can be made of carbon steel, while piping carrying LNG must utilise stainless steel, high nickel steel, or other even more expensive materials.

Mastery of this aspect of LNG plant operation is a must for SME's supplying valves, pipe fittings, flanges and fasteners for example.

The quality and technical regime applied to LNG plants is therefore of considerable importance in order to set the correct operational environment. Although LNG plants enjoy an excellent reputation for safety the consequences of failure could be catastrophic – loss of cryogenic hydrocarbon containment will quickly vaporize LNG and the resultant gas cloud expansion is rapid as the spill is warmed by the surrounding environment.

Given that LNG is 600 times denser in its liquid state than in its gaseous state this is a critical safety issue and maintaining plant integrity at a continuous low-risk state becomes a prime aim of operations.

As a consequence the quality and technical integrity regime operating in an LNG plant must be of a level of sophistication even higher than that found in conventional gas plants. Quality assurance and supplier performance must therefore be at a commensurate level with the plant technical integrity and quality regime if suppliers are to avoid problems.

Plant Operations

LNG plants are designed so that they can operate continuously 24 hours a day with a high degree of equipment availability - which is a prime contributor towards the overall reliability of the plant. As the economic impact of unscheduled plant unavailability is considerable for LNG plant operators a great deal of care is taken in equipment selection decisions and in the maintenance of those assets once handed over by the project team.

Similar demands are made of suppliers and contractors in the O&M phase particularly for those parties involved with supporting the equipment, piping and machinery that comprise the LNG trains.

Enterprise Longevity ***INSIGHT 2***

Because of enterprise longevity the mindset of LNG operators is often orientated towards the long term which can influence their approaches to market for goods and services. It is certainly evident that great care is taken in supplier selection and the bar is often set high – it is important that prospective suppliers are aware of this and respond accordingly as their standard fare may fall below operator expectations. LNG operators are often more open to the notion of longer term contractual arrangements as this enables them to work with suppliers to raise quality standards and performance over time and to make the necessary investments in people and processes to find ways to work better together.

The process is also sensitive to interruptions – substantial cooling down and warm up periods are required when the plant is taken out of service and start up procedures are lengthy and complex when compared with conventional gas plants.

As a consequence equipment reliability and availability are major considerations in plant design and procurement decision making during the project phase (see Section 7).

The legacy of those decisions manifest themselves in the O&M phase and plant operators are often gifted with an inventory of multiple redundancies in equipment. This may add more complexity to the maintenance environment.

In addition to the operational challenges brought about by the commercial arrangements and technical challenges discussed above, an LNG plant can also have more sub-systems and processes than conventional gas plants. This will complicate plant maintenance needs but will of course potentially add to the commercial opportunities available.

This combination of conditions places significantly more demands upon equipment, maintenance systems, procurement practices and the personnel involved – all of which is transferred in various ways to the community of suppliers and contractors wishing to participate in the business opportunities available in LNG plant support work.

Key Guidance

In summary there are a number of key differentiators which separate out LNG plant operations from those of other plants. These are relevant to how potential suppliers and service providers approach business opportunities in this area. The key differentiators are:-

- Potential suppliers are advised to educate themselves about the various LNG technologies being applied and the common operational practices involved in operating an LNG plant.
- Mastery of the material technology involved in low temperature processing is a must for SME's supplying valves, pipe fittings, flanges and fasteners for example.
- The quality regime is demanding and suppliers have to respond to this challenge by ensuring excellence of their service and making suitable internal investments.
- Requirements are often time critical and whilst this is a common feature of the Oil and Gas industry in general it is of particular concern to LNG plant operators because of the consequences of plant unavailability and the time demands placed upon operators.
- Providers of services that require plant access should be aware that safety concerns are substantially elevated at LNG plants.
- There are a number of highly specialised requirements (such as that for certain exotic steels) that require a tailored response from the market if local sources are to be successful in this area.
- Reliable delivery of goods and services from suppliers is therefore a key driver of business placement and must be responded to by parties competing for work in the O&M phase.
- Supplier performance and delivery must be at a commensurate level with the plant technical integrity and quality regime if suppliers are to avoid problems.
- The mindset of LNG operators is more likely to be orientated towards the long term which can influence their approaches to market for goods and services.
- FLNG may place additional certification and accreditation requirements upon suppliers to Prelude.

SECTION 6 OPPORTUNITY DIMENSIONS

Now that we have covered the basics of LNG plant operations and some of the important operating conditions that affect how business opportunities are handled, we can move to contemplation of the scale of available business from these new plants.

Enterprise Lifecycle

As previously discussed, the expected completion of a circa $176 Billion LNG investment programme in the next few years should have the effect of changing the focus of the industry.

As project opportunities dry up market forces will inevitably move business attention towards the O&M phase but our belief is that reorientation process should be quickly accelerated due to the timing of opportunities (see Section 14).

Preparing for O&M opportunities precedes the commencement of the O&M phase by several months as a minimum which needs to be recognised by the SME community.

At the time of writing this report a number of LNG developers are already building operational organisations, hiring SCM personnel for that phase and striking O&M support deals.

Comprehensive information on all current LNG developments in execution is contained in a series of Project snapshots located in Appendix 1 of this guide.

Additional Capacity

In this Section we have considered the scale of LNG projects currently in development which equate to an additional predicted nameplate capacity of **60.8 MTPA** – a 250% increase in present Australian capacity with obvious knock on implications for operators and suppliers alike.

Exhibit 6.1 provides details of that additional capacity and begins to consider the implications of O&M budgets upon business opportunities for suppliers and contractors.

As discussed in Section 6 there are issues around the use of the NWS budget estimate and needless to say the use of Dollar per MTPA as a method for deriving the true value of opportunities is also inherently inaccurate as each LNG development possesses their own unique characteristics. However, we believe it has considerable utility as a way of exhibiting overall opportunity scale.

Budget Scale for New Plants

Scaling up from NWS at $49 Million per MTPA would indicate an overall annual opportunity value from new developments to be in the region of $2.98 Billion which as we have postulated is potentially overstated.

Our research indicates that a more appropriate number for O&M activities on new onshore LNG plants should be around **$36 Million per MTPA.** Our calculation is based on a number of studies which have used a factor of 2.5% of total capital costs to estimate operating costs tested out against budget estimates for a number of current operating facilities. We have also tried to ensure that fuel gas and development costs have been stripped out from the calculation. Prelude has been treated differently because of the unique nature of the development and the fact that O&M cost estimates for that development have been recently expounded by APPEA.

Overall we believe that this produces a more appropriate measure which then can be used for determining opportunity values both on an annual basis and on an enterprise lifetime one.

Using our Dollars per MTPA figure we can then calculate budget forecasts for each new plant currently in development on a ROM basis. These calculations can be found in Exhibit 6.1 below and are subject to the same accuracy caveats as previously discussed.

These numbers are therefore provided purely for illustrative purposes only and are not to be taken as actual indicators of expenditure.

Assessment of Annual O&M Opportunity Value in New Projects

	Curtis	GLNG	Gorgon	APLNG	Prelude	Wheatstone	Ichthys
Developer	QGC	Santos	Chevron	APLNG	Shell	Chevron	INPEX
Plant Location	QLD	QLD	WA	QLD	WA	WA	NT
Process	Optimized Cascade	Optimized Cascade	Air Products MRC	Optimized Cascade	Shell DMR	Optimized Cascade	Air Products MRC
Start Date	2014	2015	2015	2015	2016	2016	2016
MTPA	8.5	7.8	15.6	8.0	3.6	8.9	8.4
No of Trains	2	2	3	2	1	2	2
Budget Estimate	$306M	$289M	$562M	$288M	$200M	$320M	$302M

EXHIBIT 6.1: ANNUAL O&M BUDGET ESTIMATES

For completeness we are mindful that calculating budget estimates based on factors is problematic but we are satisfied that this method of calculation is acceptable for the intention of identifying the overall scale of opportunity.

The individual projects listed above will also have some obvious variations – Prelude is an FLNG project with a different set of operating conditions than those faced by onshore LNG and Chevron ought to be able to obtain synergies between Gorgon and Wheatstone for example.

Notwithstanding these issues, extrapolating this figure to the additional capacity coming onstream equates to an approximate spend of **$2.27 Billion PA** once that capacity is realised.

Taking the estimated annual O&M budgets of current LNG operations and adding that to predicted future installed capacity gives a total LNG O&M spend in the region of **$3.15 Billion PA** going forward when existing plants are included. Whilst these figures are slightly lower than those contemplated by previous estimates, they are considerable sums and retain both significance and prominence.

Calculating Total Opportunity Value

We can now turn our attention to O&M business expenditure throughout the enterprise life of these LNG plants in order to gain an appreciation of the lifetime O&M opportunity value that exists.

As discussed above the predicted annual budgets are provided on a rough order of magnitude basis and have been extrapolated on our Dollar per MTPA figure. They are provided to illustrate scale and are not intended as accurate portrayals of actual budgets as these will inevitably vary from plant to plant sometimes significantly.

Similar issues of accuracy also relate to the assessment of enterprise life which is broadly based on estimated Plant design life. Our use of data is based on what is publically available at this time and as this is not available for all LNG plants we have assumed a design life of 40 years as a reasonable number to utilise in our calculations. NWS is obviously given different treatment given its unique status.

Some idea of the scale of that opportunity can be gained from Exhibit 6.2 below where we have considered this subject.

Assessment of Total Opportunity Value

Our calculation of O&M opportunity value over the lifetime of these enterprises is as follows.

	Current			Future						
	NWS	Bayu-Undan	Pluto	Curtis	GLNG	Gorgon	APLNG	Prelude	Wheatstone	Ichthys
Enterprise Life Start Date	1989	2006	2012	2014	2014	2015	2015	2016	2016	2016
Enterprise Life Estimate (yrs)	45	40	40	40	40	40	40	40	40	40
Enterprise Life End Date	2035	2046	2052	2054	2054	2055	2056	2056	2056	2056
Estimated Budget PA ($M)	$587	$137	$155	$306	$289	$562	$288	$200	$322	$302
Remaining Enterprise Life Opportunity * ($BN)	$12.3	$4.4	$5.9	$12.2	$11.6	$23.0	$12.1	$8.0	$13.2	$12.4

EXHIBIT 6.2: CALCULATION OF LIFETIME OPPORTUNITY VALUE

* Unadjusted for inflationary increases and technical integrity investment

With the obvious exception of NWS all LNG plants in Exhibit 6.2 are either a fraction into their projected lifetimes or have yet to commence operations.

What is clear is that these new enterprises could represent an additional total opportunity value (unadjusted for inflation and future investment) according to our calculations of **$91 Billion** over

their operating lifetimes with the total from all plants currently operating or in execution equating to an impressively large estimate of **$114 Billion**.

If the magnitude of actual O&M expenditure approach this general indication of opportunity scale then it is clear that the LNG plant operations will be a dominant feature of the industrial landscape for the next 40 years and a phase which offers Australian enterprises enormous opportunity.

Key Guidance

In summary there are a number of key guidelines relating to opportunity dimensions that we wish to emphasise:-

- On any measurement scale future opportunity value is highly significant
- Opportunities have longevity thus facilitating supplier focus and investment in LNG plant support
- Operational demands are nationwide with Western Australia, Northern Territory and Queensland all affected which is a further spur to market adaptation.
- Rapid evolution of SME focus and attention is required.

SECTION 7 OPERATIONAL PREPAREDNESS

Operational preparedness is a structured and disciplined process employed by LNG developers to ensue complete readiness for the successful start-up and continued operations of new plants. It is a highly complex and lengthy process which starts at a very early stage of project development.

Early Involvement

It is normal practice these days for project developers to ensure greater plant operability and reliability through the early involvement and inclusion of operations personnel in project teams. These embedded personnel will often bear direct responsibility for plant operations post-commissioning and therefore have a vested interest in ensuring that operational considerations are taken onboard when major project decisions are being made.

Equipment Selection Decisions ***INSIGHT 3***

Operations personnel participate in the selection of major plant and equipment in projects to help give balance to the final decision on where to place business. They often make a major contribution to core specifications, help determine operating envelopes of key equipment and work to ensure operability and reliability considerations figures strongly in contract awards. Projects also include operations needs for year one sparing requirements and potential service support proposals in with any equipment bids going out into the market at this stage.

The most typical areas seeing operational influence being applied within the project environment is in process design, application of new technology, component standardisation and in equipment selection decisions. These are all areas where they can have the greatest benefit to efficient and effective plant operations once the project phase has run its course.

Given that the time spent in operational phase for LNG plants are often a whole magnitude higher than the time spent developing the project it is clearly in the developers interests to ensure that any embedded Operations team is properly supported.

Plant Design

Obtaining a plant design that assists rather than hinders effective and efficient operations is obviously a prime goal of operations personnel involved in projects.

Application of New Technology

Operations will also have an interest in the selection of new technology as this will both have an effect on personnel selection and training but will also affect organisational design and future operating budgets.

Component Standardisation

Standardisation of certain components is important to operations to ensure the simplification of supply challenges, reduce inventory, lessen training burdens and, in some cases, to enhance safety.

Commissioning and Handover

Transitioning a project from its construction phase into operations is a challenging process and to assist, operations personnel are often embedded into inspection and construction teams up to two

years before start up. The handover of systems is complicated and a full handover process is usually built into project and operational schedules to allow this to proceed smoothly.

Preparing for Operations

It is also an explicit role of the operations team to prepare for the O&M phase. Depending upon individual project conditions may run from the need to establish entire supporting organisations to the adaptation of existing organisational structures and extension of existing commercial support arrangements for those developers already equipped with an operations organisation.

Nevertheless a complete set of commercial agreements fully signed up and ready for use with external contractors and suppliers are normally a prerequisite of the operational preparedness phase. This may require the setting of support agreements with the suppliers of major plant and equipment selected by the project team and the creation of pure O&M related contracts which are not part of the project scope.

As these deals have to be ready prior to plant handover the process of their establishment precedes handover by at least several months and often a year or more in advance for some categories of expenditure. It is our view that any perceptions carried by the market on the amount of time available for readiness need to be adjusted backwards by a considerable margin – there is much less time remaining than is generally recognised.

Operational Differentiators

There are a significant number of practices which are fundamentally different between the project and operational phases which are important for SME's to understand so that they may perform well in post-project processes.

Perhaps most significant is their relative use of time – unlike projects which are driven by planning networks and critical path considerations, Operations can put in place temporary measures in order to time their entry to market better or to put additional effort into raising quality of their bid documentation for example. This confers greater flexibility for O&M opportunities as they need not necessarily be event driven or have to make compromises because of schedule demands.

On the downside whilst developers now have good habits of making substantial amounts of information freely available to potential suppliers of goods and services for the capital investment stage of a projects lifecycle this effort is largely not reciprocated in the operational preparedness phase in our experience. Suppliers will almost certainly have to work harder to obtain opportunity information for O&M requirements than they had to for opportunities in the main project phase. We look at the main mechanisms of knowledge transfer in the next Section.

Key Guidance

In summary there are a number of key guidelines relating to the operational preparedness phase that we wish to emphasise:-

- O&M opportunities can manifest themselves much earlier in the development cycle than possibly appreciated by the market.
- Interested suppliers should inform themselves about those opportunities and take advantage of the knowledge transfer methods used both by the developers and by supporting organisations.
- Suppliers may have to work harder to obtain opportunity information for O&M requirements.

SECTION 8 KNOWLEDGE TRANSFER

One of the current challenges faced by the Oil and Gas industry is how to disseminate knowledge about business opportunities in a timely and accurate fashion that provides mutual benefit to all the parties involved.

It is pleasing to note that LNG developers are in the main being very proactive in their efforts to educate and explain their business needs and to equip industry with the knowledge it needs in turn to make its own investments and to plan for the opportunities coming up. We suspect it to be driven by strong corporate social responsibility influences rather than SCM ones but its presence for whatever reason is a welcome addition to the business landscape.

Opportunity Information ***INSIGHT 4***

The level of comprehension possessed by Operators about suppliers needs to possess information related to business opportunities can sometimes be rudimentary. Even when the need is accepted and the business benefits to operators themselves are understood, the ability to communicate effectively is often compromised by time and resourcing issues, the absence of demand forecasting and the lack of ownership by SCM departments of the communication tools to hand.

Upon analyzing the current suite of techniques being utilised we have observed the following measures being in place and publically advertised:-

KNOWLEDGE TRANSFER METHOD	Developer A	Developer B	Developer C	Developer D	Developer E	Developer F	Developer G	Count
1. ICN Commitment	✓	✓	✓	✓	✓	✓	✓	7
2. ICN Gateway Use	✓	✓	✓	✓	✓	✓		6
3. Developer Website	✓	✓	✓	✓	✓		✓	6
4. Dedicated Supplier Briefings	✓	✓	✓	✓	✓	✓		6
5. Guides and Factsheets	✓	✓		✓	✓		✓	5
6. AIPP Publication	✓	✓	✓	✓	✓			5
7. Local Content Advisor	✓	✓	✓	✓				4
8. Use of ProjectConnect		✓	✓			✓		3
9. Supplier Hotline	✓							1
Count	8	8	7	7	6	4	3	

EXHIBIT 8.1: KNOWLEDGE TRANSFER APPROACHES

As can be seen in Exhibit 8.1 on the preceding page there are a wide variety of techniques being utilised to project business related information.

Industry Capability Network Commitments

All developers have publically stated their commitment to working with the ICN in various ways through various documents.

Use of ICN Gateway

Most developers extended their ICN commitment to using the ICN Gateway website http://gateway.icn.org.au/ and we could only find one project that did not feature extensively on that facility.

Whilst most projects have a reasonably firm commitment to the use of ICN in the project phase this commitment atrophies during the O&M phase with very few parties visibly using ICN Gateway for operational needs. We believe that the soundest practice is to utilise ICN Gateway for the publication of operations and maintenance contracting opportunities rather than ProjectConnect to avoid confusion with the stated mission of the latter service.

Developer Websites

The corporate websites of LNG developers can play a helpful role in guiding suppliers on the operator's business philosophy, supply challenges, available opportunities and connectivity information. As websites are entirely within the control of operators this should also be highly attractive method of exercising control over the dissemination of information to suppliers.

Supplier Support Websites ***INSIGHT 5***

Australia had an early lead with the work done on Bayu-Undan in the early 2000's where that project made great efforts to provide business information to suppliers which ultimately led to the creation of the ProjectConnect facility. Most operators continue to not take complete advantage of the opportunities their own websites provide them with. Some operators provide online business guidance directly but few routinely provide forward plans about business opportunities outside of special efforts around large projects.

What is available today is highly variable and when available is not always as illuminating as it could be – in our opinion no one has yet achieved best practice in this area and our view is that much more could (and should) be done to improve the situation.

Supplier Briefings

Briefings and roadshows are a useful addition to web based information as it allows human-to-human contact to occur and participants to explore project opportunities more fully.

Briefings appear to be used widely at present with the majority of operators conducting them but we believe them to be largely project orientated rather than operational.

As a consequence we believe there is a real and continuing need for operators to ensure that their messages are getting out and that suppliers are properly responding through this mechanism, which in the absence of "Share Fair" type events remains an important feature of business life.

Share Fairs are an important innovation in the routine transfer of opportunity information from buying to selling organisations and although well embedded in other in other jurisdictions are not yet used widely in Australia.

Share Fairs ***INSIGHT 6***

Share Fairs are events where communities of buying organisations present their business methods, forward plans and business needs to mass supplier delegations. It is a widely regarded method of connecting operator's needs with supporting industry and helps equip potential sources with critical information that can influence their own investment and targeting decisions.

The best example of a Share Fare can be found in the UK Oil and Gas Sector where it is a regular annual event which attracts hundreds of supplier delegates. It has now been running with great success for over a decade and we believe this would be an attractive and useful addition to the event landscape in Australia.

Guides and Factsheets

Publication of "How to do Business" guides and factsheets aimed at SME's are highly effective in explaining to suppliers what an operator's business philosophy is and how to connect with them. They are widely acknowledged as best practice. They are reasonably available but content is highly variable and they are often short on hard core business information of the kind needed by suppliers.

Australian Industry Participation Plans

We believe it is valuable to have developer AIPP's publically available as this assists in helping the market to understand what commitments have been made and in holding the developer to those commitments.

We have found ample references to developer AIPP's and several of them are publically available through search engines or by visiting key websites. Project developers utilizing the Australian Government's Enhanced Project By-law Scheme are required to provide details of their AIPP for publication. Those developers who have made them available are to be congratulated as we believe this to be best practice.

Local Content Advisors

The presence of local content advisors on major projects is a very positive one in our view but unfortunately they do not appear to be used widely at present. Our research indicates that only three developers have broadcast that kind of organisational capability to the best of our knowledge (or developers have not made sufficient effort to make their presence known).

Use of ProjectConnect

The use of the Chamber of Commerce and Industry of Western Australia's ProjectConnect website http://www.projectconnect.com.au/ is disappointingly patchy with only three projects being featured. This is perhaps indicative of the divergence of operator business need from the ProjectConnect offering and perhaps a subject worthy of more attention than this report can provide.

Supplier Hotlines

The presence of a supplier hotline is also another positive development in our view. Unfortunately they do not appear to be used widely at present with only one developer broadcasting that kind of capability to the best of our knowledge.

Key Guidance

In summary there are a number of key guidelines relating to the knowledge transfer capabilities phase that we wish to emphasise:-

- Whilst the ICN has achieved reasonable penetration into projects this is not the case for Project Connect
- Practice is patchy with some best practice approaches not widely used.
- Consideration should be given to organising a regular Share Fair type event.
- There is a need for more supplier briefings to be conducted specifically aimed at operational needs.

SECTION 9 SCM PROCESS OVERVIEW

Whilst individual practice may vary from operator to operator most SCM processes follow a broadly similar pattern which seeks to apply logical, objective and competitive tests to discrete groups of suppliers in order to select the most likely party to deliver value for money solutions to any given set of needs.

The model we have selected to present in this guide is based on three main Phases each possessing a series of subsidiary stages. Whilst there is considerable variation and variety around, the model below does offer comprehensiveness, industry relevance and clarity which we believe make it eminently suitable for the purposes required of it in this guide.

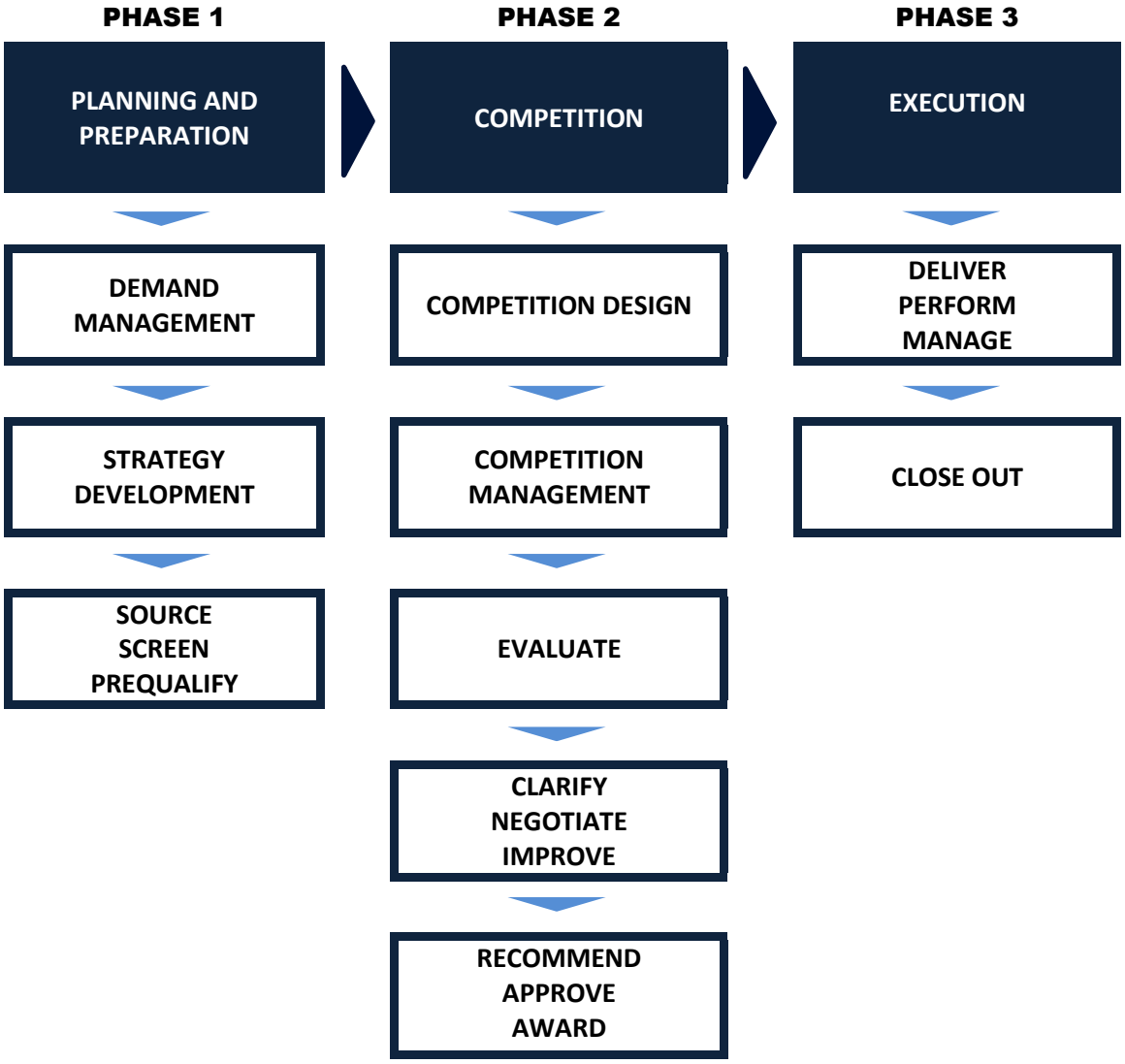

EXHIBIT 9.1: MODEL SCM PROCESS

We intend to use this model to cover a number of important aspects of the SCM process as it applies to opportunities coming out of LNG operational needs. We now consider these important processes Phase by Phase.

SECTION 10 PHASE 1: PLANNING AND PREPARATION

Operators use a variety of techniques to predict demand, to strategise, to source the market for potential sources of supply and to then screen them for capability.

In this section we are going to look at some of those processes and what suppliers and contractors interested in servicing LNG plants have to bear in mind with particular focus upon the techniques and processes deployed in the Sourcing, Screening and Prequalification stage.

MANAGE DEMAND STAGE	STRATEGY DEVELOPMENT STAGE	SOURCE, SCREEN AND PREQUALIFY STAGE
Purpose To plan for future requirements for major items of expenditure and to assess market capability to satisfy needs on a long term basis and to embed key company requirements into the process	**Purpose** To produce a formalized execution plan, agreed by all, aimed at securing the best possible outcomes	**Purpose** Screen to identify high-potential parties, flush out interest, initiate a competitive dynamic, assess capability, ensure that parties invited have award capability
Actions • Work with internal users to assess future demand • Conduct regular market assessments to understand supply-demand patterns • Understand market related risks when planning opportunity placements	**Actions** • Market assessment • Consult with interested parties • Clarify business needs • Create Execution Team • Build alignment • Agree targets • Create plan to achieve targets	**Actions** • Understand the Market • Initial conditioning • Assess capability • Understand competence • Eliminate weak parties • Create bid list • Obtain approval to proceed • Debrief excluded candidates

EXHIBIT 10.1: PLANNING AND PREPARATION PROCESS STAGES

Strategisation

Strategisation is undertaken to work out what combination of processes and techniques are utilised to maximise the best possible outcome for the operator for any given opportunity. The task is a very important precursor to the Sourcing, Screening and Prequalification Stage and to the Competition Phase which follows.

When undertaken it equips operator personnel with an understanding of market dynamics for any given category, helps them understand the strengths and weaknesses of their position and provides them with an opportunity to plan their approach to the market. It is best used for requirements where spend, HSE considerations or business criticality is significant.

The strategisation process usually results in a formal plan being developed that would normally include the following kind of content:-

- An appreciation of market conditions, background information and key players.
- A supply positioning exercise to understand the governing characteristics of the requirement.
- An assessment of the relative strengths and weaknesses of the participant's positions.
- An execution schedule with details of major constraints.
- A summary of user requirements
- Agreed targets and objectives.
- Recommendations on sourcing techniques, evaluation methods and decision making criteria.

Strategisation is also an important event to create internal alignment within the operator's organisation of how to launch and execute a sourcing exercise.

Sourcing

Sourcing is a front end process where information on suppliers operating in the required category of supply is gathered in order to develop a list of potential sources which are then subjected to tests in latter stages to prove competence. This information gathering heavily relies upon public sources such as supplier websites.

Supplier Websites ***INSIGHT 7***

The style and substance of supplier websites are of increasing importance in initial sourcing and screening activities for supplier capability. The information publically provided has high utility value to SCM as it is easily and quickly accessible. Supplier websites are also early opinion formers with sites that are well-designed and built more likely to generate positive sentiment over those that have lacked investment and attention. Suppliers wishing to do well in sourcing and screening activities should therefore ensure that the requirements of potential customers are anticipated and met.

Sourcing is undertaken chiefly to bolster existing knowledge of any supply category or where that category is new. Operators who possess extensive knowledge of supply category participants frequently skip the sourcing phase.

Screening

Screening is technique used with similar objectives to that of prequalification (see below) but is conducted in a less formal manner. It is often a relatively quick process, being conducted more rapidly and with less rigor than prequalification. As it also relies upon a smaller data set than the more formal prequalification approach it is not usually used to assess more complex and technically demanding requirements. Data gathering is usually done from easily accessible public sources or subscription services.

Prequalification

Prequalification is at its heart a logical, structured, analytical and rational process of determining capacity and capability of potential bidders. It normally relies on a formal data gathering exercise where potential bidders provide information responses to a variety of questions that operators pose on key aspects of capacity and capability. Once obtained this data is typically then assessed and scored to produce a merit based ranking to allow the selection of bidders to take place.

O&M Prequalification ***INSIGHT 8***

The high quality and technical demands on LNG plants often dictate a higher standard of excellence for suppliers wishing to penetrate that market. Prequalification is therefore part and parcel of the suite of tools operators deploy to ensure that quality is engineered into the process from a very early stage.

If used well it can make a substantial contribution to risk management through better decision making based upon a comprehensive understanding of supplier capability. It ultimately provides operators with a high degree of confidence in the abilities of selected parties so that they may be included on a bid list.

Whilst individual practice may vary from operator to operator most prequalification activities follow a generic pattern which seeks to obtain data, test that data then come to a conclusion about competence and capability. A typical process is outlined in Exhibit 10.2 below.

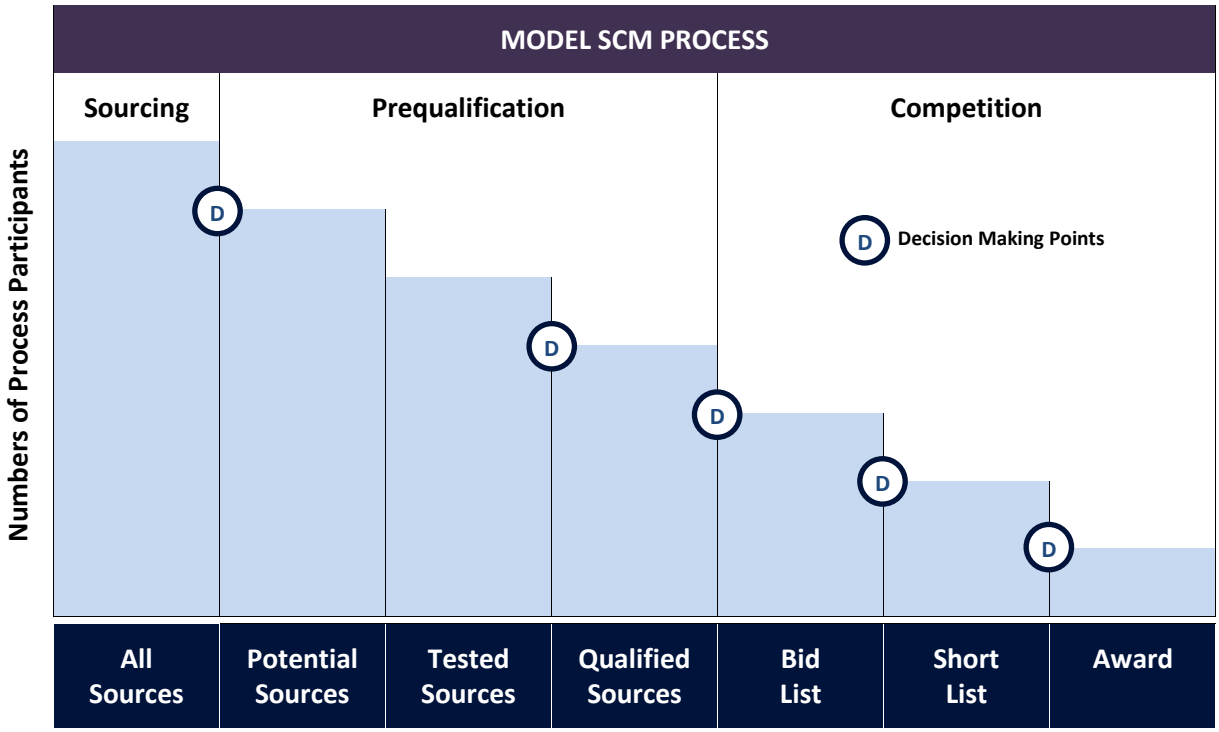

EXHIBIT 10.2: PARTICIPANT NUMBERS THROUGH MODEL SCM PROCESS

It can be observed from the above illustration that there is a steady erosion of the number of participants in the process as events progress. This is a feature of the successive tests being applied to understand capacity and capability and indicates the importance of early involvement by suppliers wishing to do business.

Evaluation Elements

Evaluation elements will vary from category to category but will typically include some or all of the following together with category specific matters:-

- Corporate Social Responsibility
- Environmental
- Facilities and Capacity
- Insurance
- Methods and capability
- Organisation and management

- Financial
- Health and Safety
- Industrial Relations
- Project Controls
- Quality
- Technical Competence

Accreditation

It is almost a universal requirement at present for suppliers to hold appropriate quality accreditation along with any required certification associated with supplying to Australian standards. It is also increasingly the case that accreditation to environmental standards is also being more frequently specified by operators.

The most common requirement specified by operators is International Organization for Standardization (ISO) 9001 which deals with quality management systems. The possession of ISO 9001 together with the periodic verification of compliance by Third party accreditation bodies provides operators with a great deal of comfort about the adequacy of basic quality systems. According to the ISO on a global basis over 1.1 million enterprises currently possess ISO 9001 accreditation with nearly 10,000 Australian companies currently in that group (up from 7,400 in 2007).

Internal Advocacy ***INSIGHT 9***

Operators do not always possess a single harmonious view about which sources of supply should participate in a competition and it is not unknown for strong advocacy to occur within their organisations about the merits of one supplier over another. Prequalification has a role to play in reducing any such stresses by using a series of fair and objective tests to determine bid lists without putting internal relationships under pressure

Another increasingly common requirement is ISO 14001 which deals with environmental management systems. As with ISO 9001 the possession of ISO 14001 provides operators with similar comfort about the adequacy of environmental management systems.

According to the ISO on a global basis over 267,000 enterprises currently possess ISO 14001 accreditation with nearly 2,000 Australian companies in that group (up from 750 in 2007).

Approved Vendors Lists (AVL)

An AVL is a maintained list of suppliers with proven capabilities against any given category of goods and services and although increasingly rare in capital projects AVLs are still occasionally found in operations. Our view is that they are becoming less common due to rapidly changing market conditions and the burden of AVL maintenance costs. In other words keeping track of change and the cost associated with that challenge is forcing the slow abandonment of AVLs.

Golden Rule ***INSIGHT 10***

Most operators have no desire to include a party on a bid list that does not possess true execution competence and the following "Golden Rule" is often used to enforce that desire.

> *"Do not place any party on a bid list that you would not be prepared to award the available business to in the event that they turn out to be commercially attractive"*

This Golden Rule is a useful test that avoids awkwardness at the point of contract award and also avoids suppliers bearing the costs of participation when there is little practical chance of success in the process. Prequalification is a tool that assists in applying this rule.

The loss of AVLs from the SCM landscape has created a vacuum that has seen the development of two practices – the first is repetitive prequalification and second is the growth in community based knowledge sharing systems which we go on to consider below. However where AVLs do still exist prequalification is still used to control access to AVL content and it should be a supplier priority to get on AVLs wherever possible.

What Prequalification Achieves for Clients

Prequalification performs a useful series of measures for operators:-

- It helps to set up the competitive event
- It helps identify potential local content opportunities at the start of the competitive process
- It largely succeeds in separating out those parties who may hold an opinion that they possess delivery capability from those that demonstrably do to the satisfaction of the assessors
- It assists to partially de-risk the bidding process and makes it more efficient and effective
- It provides a fair and logical process for decision making
- It helps to handle disappointment with unsuccessful parties and when allied with debriefs can provide useful material for supplier development purposes
- It can save everyone time and effort when used well

Prequalification Challenges

We are sure that it is not lost on suppliers that if they are not successful at prequalification then they will be losing bidding opportunities but it is a fact worthy of repetition.

In addition prequalification is an event that presents a first chance to make a positive impression upon decision makers by demonstrating capabilities and an opportunity to show genuine understanding of client needs. This can set up a successful bidding campaign by suppliers smart enough to fully and properly respond to operator prequalification activities.

However that does means spending time to strategise and organise and to make resources available to undertake that work and pay for the expense. It gives suppliers a challenge that has to be mastered if they are ultimately to be successful in winning work.

It is particularly of relevance to the O&M phase where operators may be applying prequalification practices to groups of local suppliers whose prior experience may not wholly equip them for participating to the necessary standard.

It is our opinion that prequalification practice at this time in the industry is sub-optimal due to the frequent and repetitive prequalification events taking place often on multiple projects being pursued by the same operator.

JV Partners ***INSIGHT 11***

For major items of expenditure the Joint Venture Agreement signed by the Operator with its partners frequently compels the operator to obtain bid list approval from its partners. Prequalification events are often held in anticipation of that.

It is even repetitively applied to highly competent sectors such as marine construction with even the biggest contractors being routinely expected to go through prequalification exercises. It is a major contributor towards creating unnecessary expense and is additionally a significant consumer of time and effort for both parties.

Our view is that current industry practices are also disproportionately burdensome on SME's and is an area where we believe there is ample scope for more efficient processes to be applied particularly through the use of third parties.

Use of External Parties

At the time of writing there are a number of external supply chain management service providers who are active in this field who have signed up various operators and contractors to their respective service offerings.

The two most active parties are Achilles and IS Networld (ISN) and our research has provided us with details of the current Operator sign-ups for their services as follows below in Exhibit 10.3. The local offering from Achilles in Australia is First Point Supplybase (FPS).

Known sign-ups at the time of writing are as follows but it should be noted that Operator sign up does not automatically mean that these tools are being applied either in the project or O&M phases.

SYSTEM	CONOCOPHILLIPS (Australia Pacific)	QGC	SANTOS	CHEVRON
FPS		✓	✓	
ISN	✓			✓

EXHIBIT 10.3: USE OF THIRD-PARTY SYSTEMS

Both FPS and ISN are subscription based services. Suppliers are required to pay for registration and to provide capability related data in order for FPS and ISN to perform evaluations and then post the results on their business platforms. Purchasers pay an annual subscription to access and use that data.

Ultimately all parties reap a benefit from these services by doing it once for the community rather doing it individually (and often repetitively).

Community Systems ***INSIGHT 12***

Use of collaborative based systems for knowledge sharing is growing amongst purchaser communities worldwide and is an important feature of the current business landscape. They offer great advantages to buyers and sellers alike in reducing the costs of doing business and improving the sharing of knowledge about capability and competence amongst community participants. Suppliers are well advised to join these systems where they are set up.

Neither FPS or ISN go entirely "head to head" competitively with each other as their individual service offerings are somewhat different and designed to offer a degree of uniqueness. Both approaches have a high degree of utility to operators and it is evident from Exhibit 12.3 that two camps are being formed which has the effect of imposing multiple subscriptions upon SME's that wish to do business with each community.

First Point Supplybase

The Achilles group has been actively supporting the oil and gas industry for nearly two decades and was the first entrant into this sector. In the UK their offering is FPAL which is extensively used by the Oil and Gas business in that jurisdiction. FPAL was originally developed by the UK industry for the UK industry until it was spun off to Achilles as part of an industry rationalisation programme in the 1990's.

The FPAL system was partially exported to Australia and badged as Supplybase VRS as part of the Australian Competitive Energy initiative a decade or more ago and is currently being relaunched as First Point Supplybase or FPS.

The Achilles business model is based on collaborative communities of purchasing organisations pooling their sourcing, screening and prequalification activities to drive down cost and raise standards. They undertake thousands of on-site audits and desktop assessments each year which provide objective and impartial measures of supplier capability. These are then made available to subscribing purchasers to launch a more efficient, swifter and contracted capability assessment or to directly help construct bid lists without the need for further evaluation. The approach looks at a wide range of capability elements which provides substantial breadth to the data being provided to purchasers.

IS Networld

ISN operate in a similar space to Achilles but their business model is focused on a narrower set of assessment elements centred chiefly, but not wholly, around HSE performance.

The ISN business system platform is state of the art but their capability assessment model differs slightly from the Achilles approach. Although still based upon audits and desktop assessments the ISN approach relies more upon statistical safety inputs rather than evaluations of policy and procedure and possesses considerable depth in a narrower field.

Key Guidance

In summary there are a number of key guidelines relating to sourcing and screening that we wish to emphasise:-

- Suppliers should anticipate the deployment of prequalification for LNG O&M requirements.
- As prequalification can be the entry point into competitive events there is a compelling need for it to be properly mastered.
- Suppliers wishing to supply to LNG plants should be prepared to make the necessary investment in time and budget to obtain the required credentials and skills.
- Suppliers and contractors are well advised to prepare their entry into external systems such as those provided by FPS and ISN.

SECTION 11 PHASE 2: COMPETITION

Organising and holding competitions are at the core of SCM activities. Depending on time constraints and requirement complexity the planning and preparation phase may occasionally be simplified or curtailed and some aspects of it may find their way into competitive events.

Nevertheless when well planned and well executed this phase is a key one in selecting sources of supply and Operators use a variety of techniques to do that. Conventional stages within this Phase normally conform with the following:-

COMPETITION DESIGN STAGE	COMPETITION MANAGEMENT STAGE	EVALUATION STAGE	CLARIFY NEGOTIATE IMPROVE STAGE	RECOMMEND APPROVE AWARD STAGE
Purpose To determine the nature of the competition to be held, scoping requirement, produce quality documentation aimed at securing the best deal and to set up the event for success	**Purpose** To obtain the best possible offers that will achieve the targets in the contract strategy and to support the bidders in producing high quality offers	**Purpose** To compare offers, measure them against identified needs, identify deficiencies and resolve uncertainties	**Purpose** Normalise submissions, deal with differences and improve initial offers to close any gaps between submissions and desired outcomes	**Purpose** To generate a consensus of opinion about the placing of business and to place a contract
Actions • Create detailed scope • Build the ITT • Build supporting contract • Pre-bid meetings for further conditioning • Determine format • Standardise approach • Determine Award Criteria	**Actions** • Issue competition documents • Manage change • Manage queries • Control submissions • Ensure security and process integrity	**Actions** • Team based evaluation • Objective assessment of offers • Comparison of merit • Evaluate alternative proposals • Determine leading offers • Shortlist if necessary	**Actions** • Post-Tender Negotiation if approved and if part of contract strategy • Clear up outstanding clarifications • Clear up deficiencies and non-compliances • Conclude evaluation • Agree KPI's	**Actions** • Assess risk • Generate the best most balanced solution • Consult • Secure approvals • Build contract • Make the commitment • Debrief other bidders

EXHIBIT 11.1: MODEL COMPETITION PHASE

Competition Design

The design of the competition is often an activity that commences at the Screening-Prequalification stage as information obtained at that time can be helpful in building a high quality event that obtains the best possible deal. Some of the decisions made at this stage include:

- Whether pre-bid meetings are held (these are useful additional communication tool that can help bidders understand requirements more fully prior to the more formally governed bidding stage).
- Bid format and documentation.
- Contract duration and extension periods.
- Award criteria (and an evaluation procedure for complex high-value requirements).
- Evaluation team composition.
- The bidding and evaluation schedule.

Another key issue commonly addressed at this stage is change management and transition issues associated with any given requirement. As operations progress there is often a substantial investment made in existing relationships with incumbent suppliers and contractors which can create an impediment to testing the markets out periodically.

This can lead to internal stress about when and how to launch competitions. When going to market it is not uncommon for the costs of transitioning from an incumbent party to a new one to be included in the evaluation criteria thus conferring an advantage upon the incumbent if the incumbent is held in regard by the client.

Bidding Costs ***INSIGHT 13***

There is a general lack of awareness among purchasers of the costs of participating in a competition for suppliers and this can result in competition design often seeming to unnecessarily add costs from the perspective of participants in the process. Costs of bidding continue to rise which ultimately find their way into rising tender prices themselves.

This stage leads directly to the management of the competition itself which ultimately results in the receipt of offers from invited bidders which triggers the evaluation stage and an assessment of offers against key award criteria.

Award Criteria

Companies receiving bid opportunities are occasionally assisted by operators explaining what their evaluation criteria are in the bid documentation. It is obviously important for bidders to educate themselves about both overt statements about award criteria as well as the implied ones to improve their chances of success in the competitive process.

Award criteria can be extremely diverse but usually rely on a set of commercial elements (such as price, delivery schedule and terms) and a matching set of technical requirements.

Evaluations

Operators may apply different techniques upon which they base their final decisions making and one of the key factors in that is their assessment of relative commercial merit. In order to do that they need to decide upon what basis they are going to analyse tender responses.

Conventionally one of the following evaluation methods is applied and bidders need to be aware of which one is being applied so that their offering can extract the maximum advantage from the opportunity.

Evaluation Method	What it Entails	Needs
Price	A priced based award is made on the simple basis of the headline price of an item without factoring in any other considerations and is used for basic uncomplicated goods that do not have a service component.	Complexity, effort and time requirements are relatively low with this approach.
Cost	A cost based award starts the process of incorporating other criteria into the decision making process - such as including the cost of spares in an equipment requirement such as a pump.	Complexity, effort and time requirements are relatively modest with this approach as it is a fairly simple exercise to undertake. As a consequence is a relatively common practice.
Value For Money (VFM)	An award based upon VFM continues the process incorporating other criteria into the decision making process and begins to be more complex at this point. Using VFM for our pump requirement for example would start looking at spares usage for the pump requirement over a longer period of time so that a more complete appreciation of after sales costs could be ascertained.	Complexity, effort and time requirements become a little heavier with a VFM approach. It is however a much simpler process than TCO and is quite capable of delivering similar outcomes. As a consequence it is used with reasonable frequency.
Total Cost of Ownership (TCO)	An award using TCO techniques entails a complete understanding of the cost of an item over its lifetime. Using our pump example TCO would seek to find out failure rates, pump reliability, replacement costs, service costs and performance considerations that have a commercial implication so that a TCO figure can be calculated for the ownership of that pump over its operational life.	Complexity, effort and time requirements are very high with this approach both pre- and post- tender. It requires considerable effort to run through to completion and as a consequence is a relatively rare event being used for complex equipment only.

EXHIBIT 11.2: MODEL EVALUATION TECHNIQUES

The evaluation process will naturally include a consideration of technical merit, quality and service delivery as well as commercial and contractual assessments.

The aim of the entire process is to produce a balanced and fair evaluation of the offers received.

Procurement Fraud ***INSIGHT 14***

It is an unfortunate fact of business life that the pursuit of commercial opportunities can occasionally result in inappropriate behavior and sometimes in deliberate attempts to corrupt the process. Although thankfully rare the industry has nevertheless experienced occasional lapses in the integrity of evaluation processes.

To the untrained eye some of the process steps and requirements of competitive events may seem to be needless bureaucracy but often they are important fraud prevention measures put in place to deter corruption and to ensure that fair and proper outcomes are achieved.

Clarify-Negotiate-Improve

The evaluation phase cannot be completed without dealing with the inevitable clarifications and queries that crop up during the various assessments of the offers received. Effort is also put in to handling and understanding the difference between the offers so as to ensure a level playing field and that the relative merits are completely understood.

Compliant Offers ***INSIGHT 15***

As compliant offers require less client effort to assess this often has the desirable effect of creating positive sentiment within the client team conducting the evaluation. Bid clarifications are however a largely inevitable part of any evaluation and when they occur it is important for bidders to respond promptly if they are to avoid negative sentiment being created.

This stage may also see some post-tender negotiation occur on substantive issues, most typically involving terms and conditions but also occasionally commercial pricing if a negotiation strategy had been prior approved.

Recommend-Approve-Award

Once final positions have been achieved then the evaluation is turned into a formal recommendation which should represent the collective view of the evaluation team as to which party should be awarded the available business.

Role of SCM ***INSIGHT 16***

The role of Supply Chain Management (SCM) in competition management is often complex. On one hand they are a key decision maker when it comes to determining relative competitiveness but they also fulfill other important supplementary roles.

SCM is usually the party that manages both the competition and also follow on processes such as evaluation coordination and recommendation generation all the way through to gaining approvals then making the award. They also have a role to play in policing the process to make sure that procurement fraud is deterred and in acting as a corporate conscience to ensure fairness and process integrity.

This recommendation is then put through internal governance processes to obtain approval to make the award. Depending upon value and business criticality this can often be a protracted process lasting several weeks in some cases as they require, in some circumstances, head office involvement and partner approvals. Once approval is obtained from those possessing the right authority then an award can be made.

Typical Contract Types

Operators have at their disposal a wide variety of contractual arrangements that they can utilise to structure each deal and will typically select one that best matches the business requirements for any given.

Key Guidance

In summary there are a number of key guidelines relating to the competition phase that we wish to emphasise:-

- Bidders should pay close attention to Operator messaging about evaluation criteria as this provides important clues about how decisions will be made.
- Understanding the nature of the evaluation process and what particular methodology is being followed will provide an advantage.

SECTION 12 PHASE 3: EXECUTION

The execution phase is all about turning promises into realities and well organised and thorough clients will have used preceding phases to maximise their success in this phase.

DELIVER - PERFORM – MANAGE STAGE	CLOSE OUT STAGE
Purpose To turn contract potentials into delivery realities	**Purpose** To close out contract and obtain feedback in preparation for next competitive cycle
Actions • Determine contract management approach • Manage contractor performance • Manage the relationship • Seek regular feedback from affected parties • Seek feedback on self from contractor	**Actions** • Confirm completion of contractual requirements • Deal with outstanding actions arising from completion • Complete final payments • Assess overall performance and capture outcomes and lessons for next cycle

EXHIBIT 12.1: MODEL EXECUTION PHASE PROCESS

The execution phase follows on from contract award where the parties should turn their attention from negotiating a preferential outcome for their own needs to facilitating a positive outcome for all. It is the point where the promises made during the heat of the competitive process now have to be honoured.

Relationship Management ***INSIGHT 17***

Operators enjoy productive relationships with suppliers as much as suppliers do but in the eyes of the client there is often a degree of asymmetry in those relationships with suppliers frequently perceived to get more out of those relationships than operators.

The frequent occurrence of single or sole sourcing status being prematurely released or business information freely given by operator personnel without obtaining any value-equivalent data in return is often cited as examples of this asymmetry.

SECTION 13 OPPORTUNITY MAPPING

ICN Study

During 2013 the ICN WA produced a report on "Opportunities for Small to Medium Enterprises" for companies potentially interested in operations, maintenance and facilities management of onshore Australian LNG facilities. That report is now drawn upon for this section on opportunity mapping.

Contract Opportunities

The ICN study produced a list of typical contracts required by LNG operators which has been used by us in the development of an opportunity map. This list provided by the ICN is not intended to be exhaustive but is useful for our purposes. It also creates a degree of connectivity between this opportunity guide and the ICN study which may be of some utility to SMEs.

The list contains 47 types of requirements as follows which we have supplemented with one additional generic item (other unspecified) for our own purposes elsewhere in the guide.

The full list of ICN categories is as follows:-

01	Aerial surveying	**17**	Gas turbine and compressor maintenance	**33**	Planning system for LNG production
02	Biological survey and vegetation management	**18**	General industrial consumables	**34**	Predictive maintenance and condition monitoring
03	Brownfield project execution services	**19**	General plumbing maintenance	**35**	Provision of health care services
04	Catering and domestic services	**20**	Hire plant, equipment and associated services	**36**	Provision of maintenance systems
05	Cathodic protection services	**21**	Hydraulic and pneumatic services and materials	**37**	Pump repair
06	Civil works	**22**	International freight forwarding service	**38**	Rigging and lifting supply and service
07	Consolidated environmental services	**23**	IT and telecommunication services	**39**	Rope access inspection services
08	Consultancy and inspection for electrical eqpt	**24**	Laboratory services	**40**	Scaffold supply and/or hire
09	Crane services (including maintenance)	**25**	Machinery lube oil analysis services	**41**	Security services
10	Cranes and lifting equipment	**26**	Maintenance and repair of (emergency) diesel gen's	**42**	Specialist compressor services – air compressors
11	Engineering data portal/warehouse	**27**	Maintenance coating services	**43**	Supply of personal protective equipment
12	Engineering service contract	**28**	Maintenance services	**44**	Supply pump spares
13	Fire fighting and systems maintenance	**29**	Mechanical inspection services	**45**	Temporary personnel
14	Flange management services	**30**	NDT services	**46**	Valve maintenance
15	Fuel farm equipment and general maintenance	**31**	Occupational hygiene services	**47**	Waste management services
16	Fundamental computer based training modules	**32**	Onsite machining services	**48**	Other unspecified

EXHIBIT 13.1: ICN OPPORTUNITY CATEGORISATION

The ICN categories listed in the Exhibit 13.1 have been used by us to assess each opportunity as to its relative value (measured on a Low-Medium-High scale) and an estimate of local opportunity – in other words the likelihood of an award going to an Australian entity rather than an international one – which is also measured on a Low-Medium-High scale.

Each category is then mapped in a matrix which can be found below in Exhibit 13.2

Opportunity Matrix

Our mapping process has used our knowledge and experience to produce a general guide as to the likely characteristics of each of the 47 ICN categories and should not be relied upon for guidance about how specific categories will be handled as this will inevitably vary from operator to operator.

The results of our mapping exercise can be seen below with each number corresponding to the contract opportunity listed in Exhibit 13.1.

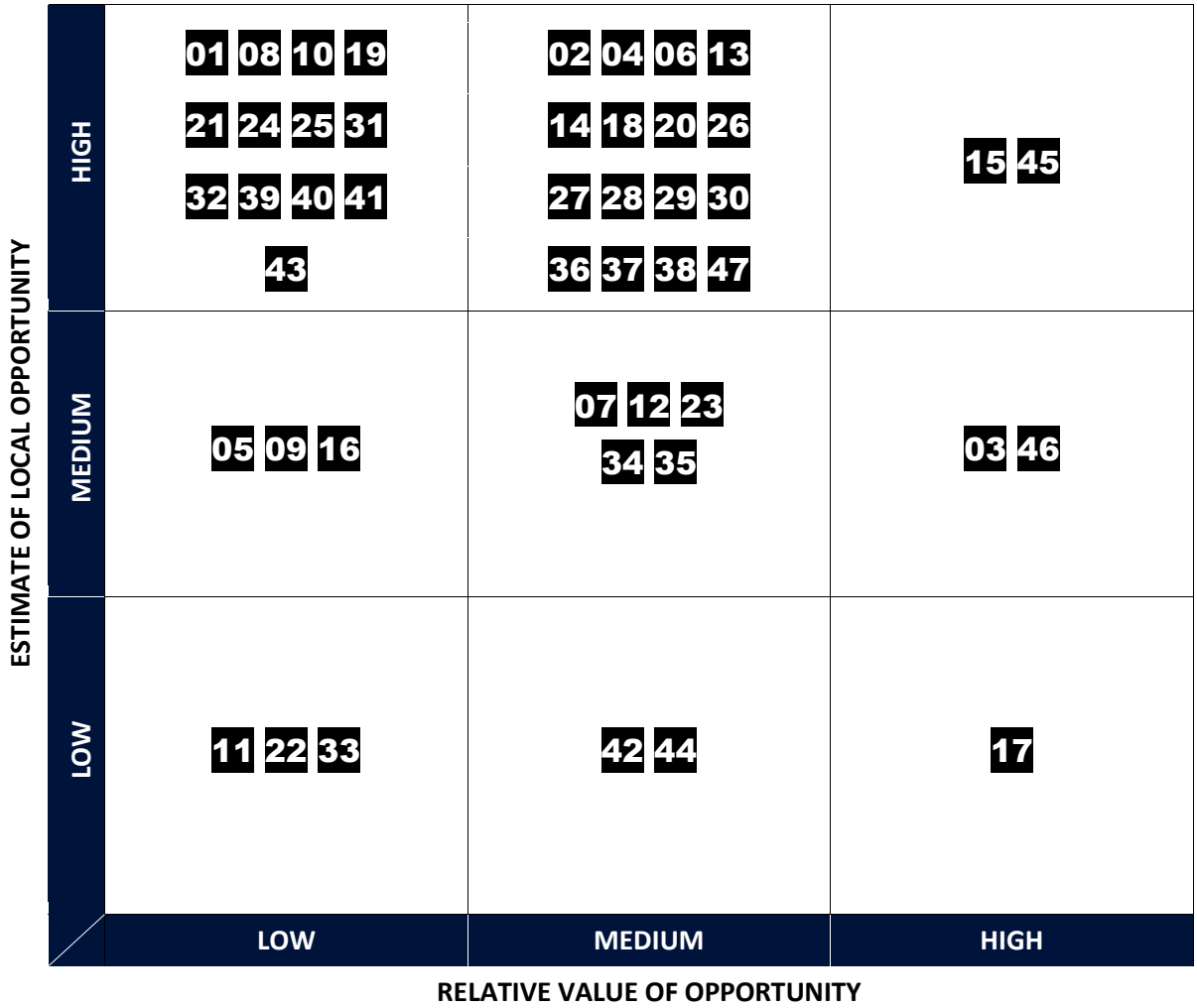

EXHIBIT 13.2: OPPORTUNITY MAPPING MATRIX

More detailed information on the placement of ICN product and service categories within the above matrix can be found in Appendix 2 at the rear of this guide. This data also features in a composite table found in Appendix 6.

Screening & Prequalification Mapping

Using the same ICN data we have also considered the potential screening and prequalification approaches that is typically most representative of each of the original 47 categories assessed by the ICN.

On the basis of the various evaluation methodologies explored in Section 11 we have considered how operators would be most likely to handle each one of the ICN categories found in Exhibit 13.1.

The results of that analysis are displayed in Exhibit 13.3 and will provide a degree of guidance to interested parties about likely operator techniques in this area. Please note that this is made available on a generic basis and does not provide for variation of approach amongst the operator community.

Sourcing Method		
Basic Sourcing	**Screening**	**Prequalification**
16 18 19 20 22 24 25 32 33 37 40 41 43 44 45	01 05 08 09 10 11 13 14 21 23 26 27 29 30 31 34 35 36 38 39 42	02 03 04 06 07 12 15 17 28 46 47

EXHIBIT 13.3: TYPICAL SOURCING TECHNIQUES

Our assessment shows a reasonably equitable distribution across the main sourcing methods with the categories that have greater complexity, business criticality or safety implications expectedly figuring prominently in the prequalification process.

More detailed information on the placement of ICN product and service categories within the above matrix can be found in Appendix 3 at the rear of this guide. This data also features in a composite table found in Appendix 6.

Evaluation Category Mapping

Once again using the ICN data we have also considered the potential commercial approaches that are typically the most representative for each of the original 47 categories assessed by the ICN.

Using the evaluation methodologies found in Exhibit 11.2 of this report, we have plotted each of the 47 categories against the various techniques explored in that section.

The results of that analysis are displayed in Exhibit 13.4 and will once again provide a degree of guidance to interested parties about likely operator techniques in this area. Please note that as before this is made available on a generic basis and does not provide for variation of approach amongst the operator community.

Evaluation Methodology			
Price	**Cost**	**Value For Money**	**Total Cost of Ownership**
06 18 19 20 21 22 40 41 44	01 02 05 07 08 09 14 16 23 24 25 28 29 30 32 33 34 37 38 39	03 04 11 12 13 15 17 26 27 31 35 36 42 43 45 46 47	10

EXHIBIT 13.4: COMMERCIAL EVALUATION MODELS

Our assessment shows a distribution slewed towards the cost and value-for-money evaluation methods - some simple price based evaluations are also likely.

It also seems unlikely that many TCO type evaluations will be seen however - we do not find this to be surprising as most TCO type evaluations are usually found in the selection processes for major plant and equipment which typically occurs during the project phase rather than in operations and maintenance.

More detailed information on the placement of ICN product and service categories within the above matrix can be found in Appendix 4 at the rear of this guide. This data also features in a composite table found in Appendix 6.

Contract Duration

The final mapping category we have considered in this guide is that of typical contract duration. Our guidance is as before heavily caveated and the view provided in Exhibit 13.5 is entirely generic in nature and does not represent any given operators position.

Once again our assessment shows a reasonably equitable distribution across the three categories of contract durations we have utilised. Typically those that have greater complexity, business criticality or safety implications have an expectedly tendency towards longer contact periods.

Contract Duration		
Short (1-2 Years)	**Medium (2-3 Years)**	**Long (3-5 Years)**
01 06 08 10 16 18 19 20 21 22 32 38 39 40 41 45	02 03 07 09 12 13 14 24 25 26 27 29 30 31 35 37 42 43 46	04 05 11 15 17 23 28 33 34 36 44 47

EXHIBIT 13.5: TYPICAL CONTRACT DURATIONS

More detailed information on the placement of ICN product and service categories within the above matrix can be found in Appendix 5 at the rear of this guide. This data also features in a composite table found in Appendix 6.

Single and Sole Sourcing

Confusion often exists about the difference in meaning between "Sole" and "Single" sourcing. The most common accepted definition for a Sole Source is where there is only one supplier capable of providing the commodity or service required and no competition exists.

For Single Source situations it is where several potential sources for the commodity or service exist and competition is possible, but there is an overriding reason to use only one of those sources (usually related to technical or schedule needs).

Sourcing Vulnerability ***INSIGHT 18***

Being in a Single or Sole Source situation is uncomfortable for Operators as they are generally unable to produce a competitive dynamic for requirements that fall into this category. The existence of these situations are occasionally communicated to suppliers by internal users without fully appreciating the effect of that information release – this can of course unnecessarily increase pricing and will create some tension between internal users and SCM personnel.

Operators commonly deal with the situation by disguising the situation (to the extent they can) from the supplier or may attempt to develop alternative sources. Each single or sole source situation also typically has some special governance applied to ensure that each occurrence is legitimate and isn't being used to circumvent company policy and procedure.

Integrated Services

There are a number of contractors who are able to offer multi-disciplined integrated service offerings to clients. Integrated Service contracts typically incorporate a wide range of maintenance type services under a single deal and also may include a number of activities more usually undertaken by operators themselves.

Outsourcing O&M ***INSIGHT 19***

Integrated Service contracts are well liked by those operators who are open to outsourcing arrangements and who do not want to commit to recruiting and maintaining large operations organisations. In these circumstances many business opportunities do not come to market (as they are integrated into more comprehensive scopes of work) and others manifest themselves in the market from Integrated Service contractors rather than operators.

Parties active in this service category require enhanced capabilities (such as workload planning, campaign capability and shutdown management) to deal with the increased risk and complexity inherent in these arrangements. The service and supply categories typically found in Integrated Service contracts have been highlighted in light blue in our opportunity matrix below.

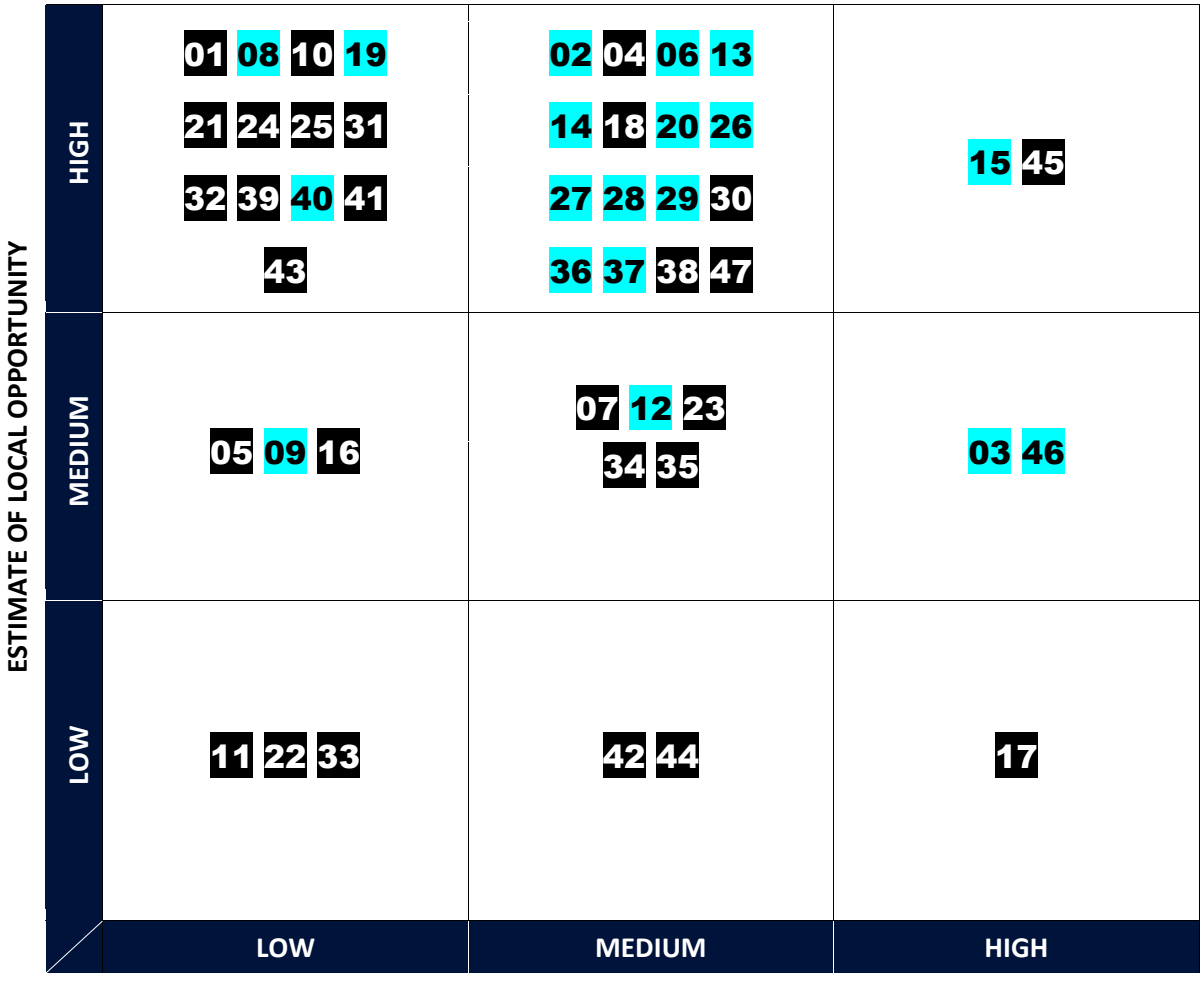

EXHIBIT 13.6: INTEGRATED SERVICE CATEGORIES

A list of contractors with declared Integrated Service contracting capability can be found in Appendix 7 at the end of this guide.

Key Guidance

In summary there are a number of key guidelines relating to opportunity mapping that we wish to emphasise:-

- The mapping exercise confirms that opportunities are positively shifted towards Australian enterprises with 31 of the 47 categories (or 66%) residing in the high likelihood category.
- Opportunities are also shifted towards relatively lower opportunity value with category concentrations in low and medium types.
- Substantial numbers of opportunities are likely to undergo operator screening or formal prequalification processes.
- Few categories lend themselves to complex commercial evaluation techniques such as TCO but substantial numbers of them will not be awarded on simple price alone.
- Some opportunities may not come to market for SMEs due to the presence of Integrated Service providers in the market.

SECTION 14 OPPORTUNITY TIMING

As previously noted in Section 7 the operational preparedness phase whilst often a lengthy one does start (in our opinion) much earlier than the market perhaps realises. This may currently be a feature of the project opportunities masking operational ones in the mindset of the industry but there is danger in a late realisation of the issue.

If not addressed this situation can result in a number of issues:-

- Lost opportunities for those suppliers failing to recognise tendering timing
- A lessening of competition quality for operators

At the time of writing there are multiple opportunities already being worked upon as can be seen from Exhibits 14.1 and 14.2.

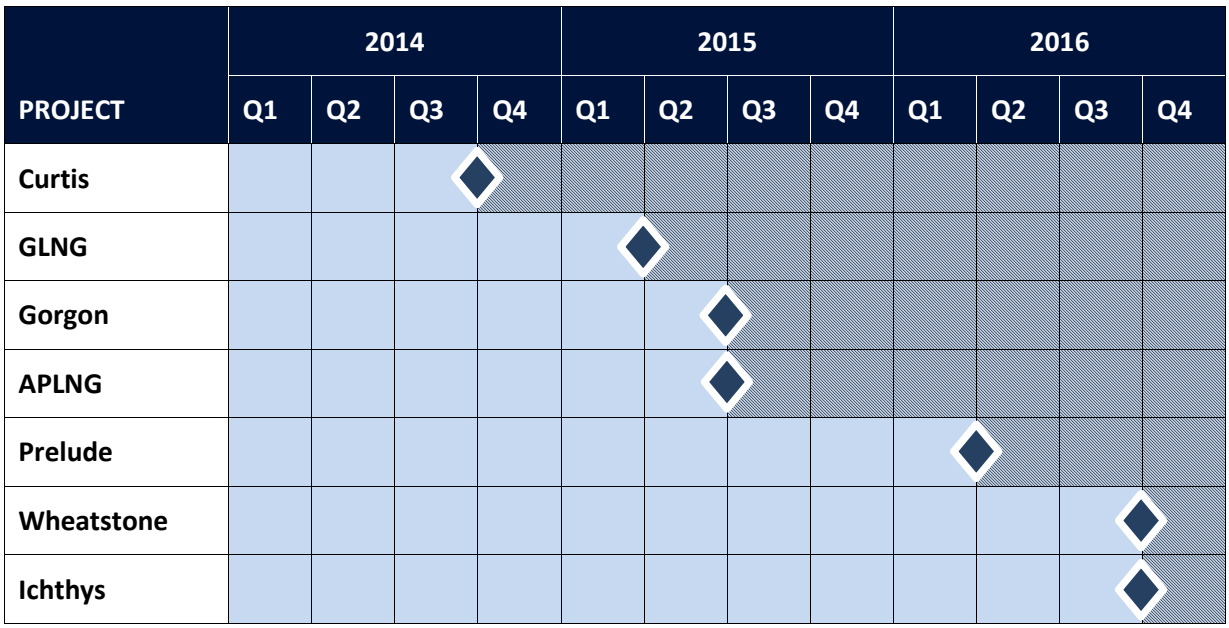

EXHIBIT 14.1: OPPORTUNITY TIMINGS

Operational Preparedness Operations First Production

Current Situation

As noted in the preceding Section, the ICN report on "Opportunities for Small to Medium Enterprises" listed a variety of requirement types which we have used to create a map aimed at producing a more complete understanding of where the most significant opportunities for Australian businesses lie.

We can now take that list and look at where actual competitive opportunities (as opposed to expressions of interest) have already manifested themselves or where they are about to occur. As with other sections we have relied extensively on publically available data to complete this particular assessment and as previously we must provide counsel about the inherent issues relating to this type of dependency. Our indicative assessment on timing can be found in Exhibit 14.2 below.

We also faced a predictable dilemma about the categorization of opportunities as they have been described in different ways by different developers – we have used our expertise and judgment from time to time to handle any taxonomy issues arising in the course of our assessment.

We would therefore caution any party in relying upon the following data for making decisions about opportunity timing – that is not the intent of the following information and it is provided merely as a method of understanding the overall picture concerning opportunity timing.

	2014	2015	2016
Visible Competitive Opportunities	02 12 18 20 22 23 28 32 34 48	06 17 48	03 08 09 10 12 13 14 19 20 21 26 27 28 34 36 37 40 46 38 48

EXHIBIT 14.2: VISIBLE OPPORTUNITY TIMING

Key Guidance

In summary there are a number of key guidelines relating to opportunity timing that we wish to emphasise:-

- There is danger in a late realisation that the operational preparedness phase starts earlier than the market currently appreciates.
- In our view it is imperative that suppliers take immediate steps to take advantage of those opportunities already being contemplated in the short-term as well as those to come.
- More can be done to publish the entire picture of opportunity timings, possibly through ICN, as well as the individual project entries on ICN Gateway.
- It is in the interest of developers to have well briefed and educated suppliers undertaking preparations for operational contracts and the efforts they made in transferring knowledge about project opportunity need to be replicated for operational needs.
- Developers would also be well advised in our view not to rely too heavily and exclusively upon the efforts made by ICN in making information available and need to take some steps to offer alternative information delivery methods.

SECTION 15 SUMMARY OF KEY GUIDANCE POINTS

Current Assets

1. Figures on the value attributed to O&M opportunities emanating from NWS in latest estimates may be overstated.
2. NWS budgetary estimates are unlikely to be wholly applicable to other LNG plants because of the unique conditions pertaining to NWS
3. It is difficult to be entirely accurate about total opportunity value but with the scale of developments being so prolific that is perhaps a smaller issue than it might otherwise have been.
4. Existing operations may find themselves short of attention as supplier focus potentially moves onto new opportunities.

LNG Operations

5. Potential suppliers are advised to educate themselves about the various LNG technologies being applied and the common operational practices involved in operating an LNG plant.
6. Mastery of the material technology involved in low temperature processing is a must for SME's supplying valves, pipe fittings, flanges and fasteners for example
7. The quality regime is more demanding and suppliers have to respond to this challenge by ensuring excellence of their service and making suitable internal investments.
8. Requirements are often time critical and whilst this is a common feature of the Oil and Gas industry in general it is of particular concern to LNG plant operators because of the severe consequences of plant unavailability and the time demands placed upon operators because of cargo sailings.
9. Providers of services that require plant access should be aware that safety concerns are substantially elevated at LNG plants.
10. There are a number of highly specialized requirements (such as that for specialized steels) that require a tailored response from the market if local sources are to be successful in this area.
11. Reliable delivery of goods and services from suppliers is therefore a key driver of business placement and must be responded to by parties competing for work in the O&M phase.
12. Supplier performance and delivery must be at a commensurate level with the plant technical integrity and quality regime if suppliers are to avoid problems.
13. The mindset of LNG operators is more likely to be orientated towards the long term which can influence their approaches to market for goods and services.
14. FLNG may place additional certification and accreditation requirements upon suppliers to Prelude.

Opportunity Dimensions

15. On any measurement scale future opportunity value is highly significant
16. Opportunities have longevity thus facilitating supplier focus and investment in LNG plant support

17. Operational demands are nationwide with Western Australia, Northern Territory and Queensland all affected which is a further spur to market adaptation.
18. Rapid evolution of SME focus and attention is required.

Operational Preparedness

19. O&M opportunities can manifest themselves much earlier in the development cycle than possibly appreciated by the market.
20. Interested suppliers should inform themselves about those opportunities and take advantage of the knowledge transfer methods used both by the developers and by supporting organisations.

Knowledge Transfer

21. Whilst the ICN has achieved reasonable penetration into projects this is not the case for Project Connect
22. Practice is patchy with some best practice approaches not widely used.
23. Consideration should be given to organising a regular Share Fair type event.
24. There is a need for more supplier briefings to be conducted specifically aimed at operational needs.

Planning and Preparation

25. Suppliers should anticipate the deployment of prequalification for LNG O&M requirements.
26. As prequalification can be the entry point into competitive events there is a compelling need for it to be properly mastered.
27. Suppliers wishing to supply to LNG plants should be prepared to make the necessary investment in time and budget to obtain the required credentials and skills.
28. Suppliers and contractors are well advised to prepare their entry into external systems such as those provided by FPS and ISN.

Competitions

29. Bidders should pay close attention to Operator messaging about evaluation criteria as this provides important clues about how decisions will be made.
30. Understanding the nature of the evaluation process and what particular methodology is being followed will provide an advantage.

Opportunity Mapping

31. The mapping exercise confirms that opportunities are positively shifted towards Australian enterprises with 31 of the 47 categories (or 66%) residing in the high likelihood category.
32. Opportunities are also shifted towards relatively lower opportunity value with category concentrations in low and medium types.
33. Substantial numbers of opportunities are likely to undergo operator screening or formal prequalification processes.
34. Few categories lend themselves to complex commercial evaluation techniques such as TCO but substantial numbers of them will not be awarded on simple price alone.

35. Some opportunities may not come to market for SMEs due to the presence of Integrated Service providers in the market.

Opportunity Timing

36. There is danger in a late realisation that the operational preparedness phase starts earlier than the market currently appreciates.
37. In our view it is imperative that suppliers take immediate steps to take advantage of those opportunities already being contemplated in the short-term as well as those to come.
38. More can be done to publish the entire picture of opportunity timings, possibly through ICN, as well as the individual project entries on ICN Gateway.
39. It is in the interest of developers to have well briefed and educated suppliers undertaking preparations for operational contracts and the efforts they made in transferring knowledge about project opportunity need to be replicated for operational needs.
40. Developers would also be well advised in our view not to rely too heavily and exclusively upon the efforts made by ICN in making information available and need to take some steps to offer alternative information delivery methods.

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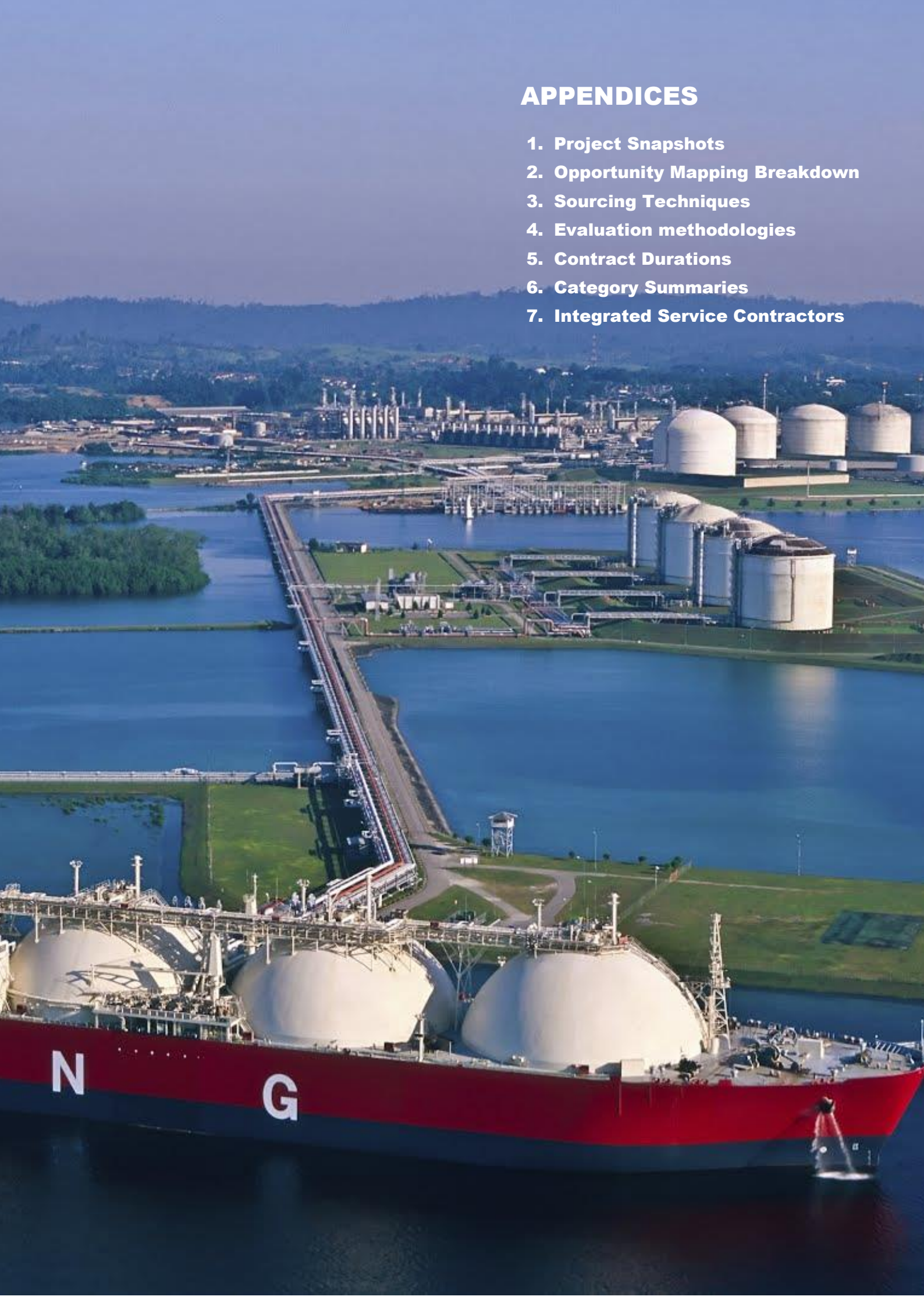
APPENDICES

1. Project Snapshots
2. Opportunity Mapping Breakdown
3. Sourcing Techniques
4. Evaluation methodologies
5. Contract Durations
6. Category Summaries
7. Integrated Service Contractors



APPENDIX 1 Project Snapshots

AUSTRALIA PACIFIC LNG

Developer	• The Australia Pacific LNG (APLNG) consortium.
Partners	• Origin Energy, ConocoPhillips, Sinopec.
Location	• APLNG's operations are in Queensland with LNG plant at Curtis Island.
Development Timeframe	• Scheduled to be operational in 2015 • First LNG export from Train 1 is expected in mid-2015 with Train 2 expected to follow towards the end of 2015
Key Features	• APLNG is already the largest producer of CSG in Australia, supplying gas to power stations to produce lower emissions electricity; major industrial customers, homes and businesses in South-East Queensland. The Project will see an increase in domestic gas production to further supply gas-fired power stations, major industrial customers and residents throughout Queensland. • APLNG's gas fields lie in the Surat and Bowen Basins in South-West and Central Queensland • An LNG processing and export facility on Curtis Island off the coast of Gladstone comprising of two processing trains, each with the nameplate production capacity of 4.5 MTPA. • A 530 kilometer gas transmission pipeline will take gas to the LNG facility. • The Project will create over 1,000 local jobs once the project is operational. • It has the ability to increase local skills and boost regional and localized economies during the operational phase. • Project has committed to $200 Million of investment in community funding, roads and transport infrastructure, upgrades to regional airports and local training opportunities. • Engagement with Australian businesses has hit $9 Billion to date (over 80% of the Project's spend) with $7.2 Billion being spent in Queensland alone. • The Project is making use of the experience of ConocoPhillips as a joint venture partner which has been operating the Darwin LNG facility since 2006.
Relevant Strategies Being Pursued	• Multiple access points into project opportunities are available and include existing supplier databases of Origin, the Project website and the ICN. • Conventional prequalification activities are utilised to conduct filtering and screening in order to ensure that only capable and competent sources find their way onto bid lists. • A Local Content Advisor is available on the project which is considered to be best practice.

AUSTRALIA PACIFIC LNG

- A dispute hotline has been established to handle issues which is worthy and reflects well upon the project.
- Australia Pacific LNG's indigenous engagement strategy is targeting improved opportunities for indigenous owned companies.
- Brisbane based and regional supplier information sessions have been conducted

AIPP Details

- The project has a published a sophisticated and comprehensive AIPP in its commitment to maximize local content.
- It aims at providing full, fair and reasonable access to opportunities for Australian industry from itself and its sub-suppliers.
- It acknowledges the necessity of properly controlling the SCM activities of key sub-suppliers to further the intent of their AIPP.
- There are tests of practicality included in the AIPP which is normal and entirely appropriate.

Working with the ICN

- Their AIPP makes reference to multiple access points for project opportunities are available and include the ICN in that statement.
- A tiered assessment tool is being utilised to help position suppliers correctly.
- ICN Gateway contains full details of the project and its key components.

Working with ProjectConnect

- Use of ProjectConnect is not explicitly included in their AIPP.
- The project is not featured on the ProjectConnect website.

QUEENSLAND CURTIS LNG

Developer	• QGC - a wholly owned subsidiary of the BG International Group
Partners	• QGC have an equity partnership agreement in place with CNOOC for Train 1.
Location	• Exploitation of a CSG field in the Surat Basin of Southern Queensland within the Western Downs Local Government Area. • LNG processing plant and export facility on Curtis Island, near Gladstone. • A pipeline network links their gas accumulations to the LNG plant. • Project Drilling activities are concentrated in the Western Downs, nearest the larger towns of Dalby, Chinchilla and Miles.
Development Timeframe	• Construction commenced in 2010. • Scheduled to be operational in 2014.
Key Features	• An expansion of QGC's coal seam gas operations in the Surat Basin • A 730 kilometre network of gas pipelines • LNG plant and export facility with two trains on completion each capable of producing 4 million tonnes of LNG per annum giving an overall capacity at commissioning of 8.0 MTPA • The site has additional expansion capacity for a third train. • QGC expects to drill 6,000 wells over more than 4,500 km^2 of tenements by 2030 with 2,000 of them completed by the end of 2014. • Operations are predicted to provide long-term employment for more than 1,000 people over the next 20 to 30 years • QGC are committed to making a capital investment of $20.4 Billion between 2010 and 2014. • QGC reports that it has $1 Billion of current contracts in Gladstone and has invested $12 billion (or 80% of the $14.9 billion spent since 1 January 2010) with Australian firms.
Relevant Strategies Being Pursued	• Development of indigenous businesses to service CSG-LNG operations and contractor indigenous participation • Training commitments with major contractors focused on indigenous people, women, young people and the unemployed • A public commitment to full, fair and reasonable opportunity for local suppliers and contractors stretching across the project and operational phases has been made. • Under their SIMP, QGC plan on investing circa $150 Million on community services up to 2014. • October 2013 saw the opening of the Gladstone Supply Base - a 2,000 m^2 facility which will be the control point for all equipment and materials going to and from the LNG plant once it is operating. The base will also be the staging area for planned maintenance and provide storage for major spare parts and equipment.

QUEENSLAND CURTIS LNG

	• Tenders submitted will undergo rigorous scrutiny and high levels of competition from competitors. • QGC has publically advised that it is important for businesses looking to work on Curtis to have a high-quality and effective 'capability profile' which provides QGC with important information such as Company capabilities, size, capacity, ability to ramp up operations quickly, financial stability and compliance with safety and environmental standards.
AIPP Details	• The Queensland Curtis LNG AIPP is widely referenced. • QGC have published a Local Content Commitment which contains all the major elements you would expect to see in an AIPP. • Provide full, fair and reasonable opportunities. • Provide information to local businesses on opportunity. • Consider local businesses to enhance local content outcomes. • Ensure that their Local Content policy is passed down their supply chains. • Give preference to bidders that maximise local content over comparable tenders • Work with other parties to improve local capability and competitiveness. • Periodically and publically report on progress.
Working with the ICN	• QGC has been working with the ICN for several years and has the expectation that this will lighten the burden on contractors in looking out for the next working opportunity and can instead focus on the task at hand. • The ICN Gateway website is QGC's first port-of-call for updates including a range of useful information on upcoming tenders as well as the company and its contractors. • The bulk of the project is to be delivered by Tier 1 main contractors and as a consequence a major focus of QGC is to assist suppliers who are registered on the ICN Gateway to position themselves to supply to major contractors. • Curtis is fully featured on the ICN Gateway for both project and O&M opportunities.
Working with ProjectConnect	• The project is not featured on the ProjectConnect website.

GLNG

Developer	• Santos
Partners	• The joint venture arrangement is Santos, Petronas, Total and KOGAS.
Location	• The Project involves developing gas fields from the Bowen and Surat Basins in south-western Queensland, and will transport the gas via a 420 kilometer pipeline to an LNG plant on Curtis Island near Gladstone.
Development Timeframe	• Scheduled to be operational in 2014
Key Features	• The plant capacity at commissioning is 7.8 MTPA • The level of investment in GLNG is circa US$18.5 billion and to date, the Project has let over $3 Billion in contracts to Australian businesses.
Relevant Strategies Being Pursued	• Santos is committed to providing full, fair and reasonable opportunities for local industry to compete for work, giving them the maximum opportunity to bid for and win contracts. • They have stated that they will work with government, industry bodies and communities to improve local industry participation, capability and competitiveness. • They desire to create a positive legacy for the communities affected by the project by investing in social and economic development opportunities. They aim to maximise opportunities for local employment, industry development, training and apprenticeships. • Santos is partnering with three key contractors in the project phase - Saipem, Fluor and Bechtel. Fluor are working to develop the Bowen and Surat basin gas fields. Saipem will construct the 420 kilometer gas transmission pipeline. Bechtel are constructing the LNG Plant on Curtis Island.
AIPP Details	• The GLNG AIPP is widely referenced. • Its content is believed to be entirely conventional in nature and would commit Santos and their contractors to maximise the opportunities for Australian businesses to be involved in providing materials, equipment, labour, plant and professional skills.
Working with the ICN	• The Project is working with the ICN Queensland to help Australian suppliers, sub-contractors and service providers register their interest in working on the Project. • The project does not feature on the ICN Gateway website.
Working with ProjectConnect	• The project is not featured on the ProjectConnect website.

GORGON

Developer	• Chevron Australia Pty Ltd
Partners	• The Gorgon Project is operated by Chevron. It is a joint venture of the Australian subsidiaries of Chevron, ExxonMobil, Shell, Osaka Gas, Tokyo Gas and Chubu Electric Power.
Location	• Chevron is developing the Gorgon and Jansz-Io gas fields, located within the Greater Gorgon area, between 130 and 220 kilometers off the northwest coast of Western Australia. • Much of the project infrastructure is located on Barrow Island (a Class A Nature Reserve) and occupies 1.3 % of its un-cleared land mass.
Development Timeframe	• The project was originally due to startup the plant in late 2014 leading to the first LNG cargo in the first quarter of 2015.
Key Features	• The $54 billion Gorgon Project is the largest single resource development in Australia's history and Chevron predicts it will require $33 billion in Australian goods and services over first 30 years of its operational life. • With a capacity 15.6 MTPA Gorgon is one of the world's largest natural gas projects and the largest single resource development in Australia's history. • It includes the construction of a LNG plant on Barrow Island and a domestic gas plant with the capacity to supply 300 TJ of gas per day to WA. • Gorgon LNG will be off loaded via a 2.1 kilometer long loading jetty for transport to international markets. The domestic gas will be piped to the Western Australian mainland. • The Gorgon joint venture is investing approximately $2 Billion in the design and construction of the world's largest commercial-scale CO_2 injection facility to reduce the project's overall greenhouse gas emissions by between 3.4 and 4.1 million tonnes per year. • The Australian Government has committed $60 Million to the Gorgon CDI Project as part of the LET demonstration fund. • The Gorgon Joint Venture has already committed $20 Billion to Australian goods, services and labour.
Relevant Strategies Being Pursued	• Gorgon will actively support Australian industry participation as a core business policy, in line with the Australian Industry Participation National Framework and the Gorgon Gas Processing and Infrastructure Project Agreement. • A series of supplier briefings were held in 2008-2009 according to the Chevron supplier support website.
AIPP Details	• Chevron has made the Gorgon AIPP publically available. • Provide full, fair and reasonable opportunity for Australian industry to supply goods and services to the Project

GORGON

- Utilise the resources of the Industry Capability Network (ICN) and other sources including ProjectConnect, SupplyBase VRS (now FPS) and Pilbara Business Capability Register (ePilbara), as appropriate, to identify those Australian companies able to supply goods or services commensurate with the quality, safety, environmental, reliability and delivery standards and objectives of the Project.
- Provide information and facilitate Project briefings to Australian industry in order for local suppliers to have adequate time to identify potential opportunities and establish their competitive position.
- Identify structural impediments to competitive Australian Industry Participation, such as lack of infrastructure and skills shortages and, with ICN support, make industry and government aware of any such perceived limitations.
- Encourage offshore manufacturing and service companies who have leading edge technology applicable to the Gorgon Project to establish local facilities or manufacturing licensees and to aid in technology transfer.
- Assist Australian industry in forming strategic joint ventures or alliances with offshore companies.
- Facilitate contractor and subcontractor alignment with the policy, by including our AIP requirements in all contracts and purchase orders and make it a condition that these are reflected in all subcontracts and contractor placed purchase orders.
- Ensure that Australian design, engineering, manufacturing, construction and project management capabilities are considered
- When preparing scopes of work to enhance Australian industry opportunities, without impacting on the Gorgon Project's safety, environment, reliability, quality, cost or schedule objectives.
- Establish a supplier diversity program and work with regional organisations, indigenous organisations and ICN to establish links between the Gorgon Project and local business, including a capability register and capacity building activities.
- Establish a measurement system to track and report the extent to which local content is utilised.

Working with the ICN

- A link to the Chevron Gorgon site is provided on the ICN Gateway.

Working with ProjectConnect

- Gorgon is fully featured on ProjectConnect.

ICHTHYS

Developer	• INPEX Browse Ltd
Partners	• The Ichthys LNG Project is a Joint Venture between INPEX along with a major partner in Total.
Location	• The Ichthys field is in the WA-285-P permit area, located in the Browse Basin, off the north-west coast of Western Australia and approximately 820 kilometers south-west of Darwin. • Landfall of the export gas pipeline and the LNG processing facilities is in Darwin.
Development Timeframe	• Scheduled to be operational at the end of 2016.
Key Features	• Most likely resource estimates for Ichthys are 12.8 TCF of gas and 527 million barrels of condensate produced over an operational life of more than 40 years. • The development concept for Ichthys is broadly similar to that of Bayu-Undan with offshore liquids stripping and onshore gas processing into LNG. • Gas from the Ichthys Field will undergo preliminary processing at the offshore central processing facility to remove water and raw liquids, including a large proportion of the condensate. This condensate will be pumped to an FPSO facility anchored nearby, from which it will be transferred to tankers for delivery to markets. • The treated gas will be transported through a subsea pipeline more than 885 kilometres to the LNG processing plant proposed for Blaydin Point on Middle Arm Peninsula, Darwin, Northern Territory. • Ichthys will have an initial capacity to produce 8.4 million tonnes of LNG per annum and 1.6 MTPA of LPG, as well as approximately 100,000 barrels of condensate per day at peak production. • Key offshore facilities include a semi-submersible central processing facility, an FPSO unit for condensate treatment and storage and an 885 kilometre export pipeline to Darwin. • Onshore facilities include two LNG trains with a capacity of 8.4 million tonnes per annum, LPG and condensate processing plants, storage tanks for LNG, LPG and condensate, administration facilities, utilities and services, power generation and a product offloading jetty
Relevant Strategies Being Pursued	• INPEX's core business values include actively promoting and providing full, fair and reasonable opportunities for Australian companies to supply goods and services to the Ichthys Project. • INPEX actively seeks suppliers and contractors whose objectives are compatible with their own – those with a commitment to delivering the highest-quality products, services and worldwide cost competitiveness in the marketplace and an unwavering commitment to safety.

ICHTHYS

	• EPC activities will be undertaken by the JKC Joint Venture, comprising of JGC Corporation, KBR and Chiyoda Corporation. The Ichthys LNG plant and associated facilities (including the Howard Springs accommodation village) are being built by JKC Australia LNG Pty Ltd. JKC is made up of JGC Corporation, KBR and Chiyoda Corporation. These three organisations have been collectively responsible for designing and delivering a large percentage of the world's major oil and gas processing plants, including large-scale LNG facilities across the globe. • In September 2008 INPEX selected Darwin as the site for the LNG plant. • The Project is now in the construction phase, following a FID in January 2012 which is being chiefly executed by JKC Australia LNG.
AIPP Details	• Ichthys has made its AIPP publically available. • It ensures Australian industry is provided Full, Fair and Reasonable opportunity to participate in Ichthys Project opportunities. • Develop long term relationships, through the Ichthys Project, to ensure innovation, effective cost management and value added solutions are delivered. • Encourage and facilitate local business participation and development in the oil and gas industry. • Identify and increase the number of local people with the skills to work in the oil and gas industry. • Increase livelihood opportunities for local Aboriginal and Torres Strait Islander communities through direct employment and business engagement.
Working with the ICN	• INPEX encourages suppliers and contractors wishing to engage with the Ichthys Project to contact the ICN in the Northern Territory. ICN NT will be providing specialist Australian vendor identification services for the duration of the Ichthys Project. • ICN Gateway has been selected as the primary tool for communicating upcoming procurement and contracting opportunities and for managing registrations of interest for the Ichthys Project. • ICN Gateway will also be utilised by the Project to communicate with suppliers and contractors as relevant information becomes available. • Ichthys is currently fully featured on ICN Gateway including some initial operational requirements.
Working with ProjectConnect	• Ichthys is not featured on ProjectConnect.

PRELUDE

Developer	• Shell Development (Australia) Pty
Partners	• Shell is the main equity holder and Operator of the Prelude and Concerto fields. Other partners are Inpex, Kogas and CPC.
Location	• The field is located in permit area WA-44-L which covers around 1,000 km^2 in the Browse Basin, 475 kilometers north-northeast of Broome, Western Australia and 200 kilometers from the nearest landfall. • Being a FLNG project Prelude has no onshore gas processing facilities.
Development Timeframe	• In January 2007, Shell discovered gas in the Browse Basin, approximately 475 kilometers north-east of Broome, off the coast of Western Australia. A second gas discovery was made in March 2009. • In July 2009, Shell awarded a consortium of Technip and Samsung Heavy Industries the contract for the design, construction and installation of multiple FLNG facilities over a period of up to 15 years, based upon Shell's proprietary design. • In May 2011, Shell made the decision to proceed with the Prelude FLNG Project and start construction. • Prelude is scheduled to be operational in 2016.
Key Features	• Prelude is big – the facilities deck is bigger than four soccer fields laid end to end and it would take six of the United States Navy's largest aircraft carriers to displace the same amount of water as Prelude. • Prelude and Concerto have around 3 TCF of liquids-rich gas. According to the operator the relatively small size of the gas fields and the remote location make them an ideal candidate for development via Shell's FLNG technology as it would not be economic to develop the gas via a conventional onshore LNG processing plant. • After processing at the site of the gas field, ocean-going LNG carriers will offload LNG directly from the facility out at sea for delivery to markets worldwide. Until Prelude the liquefaction of offshore gas has always involved piping the gas to a land-based plant. • FLNG technology is an important development for the LNG industry as it reduces both the costs and the environmental footprint of a LNG facility. • There are currently no FLNG facilities deployed anywhere in the world, so Shell's Prelude FLNG Project is likely to be the world's first. For Australia, the Prelude FLNG project will demonstrate a means of developing some of Australia's "stranded" offshore gas reserves - those considered uneconomic for development via an onshore plant because they are too small or remote (the CSIRO estimates Australia has around 140 TCF of stranded gas). • The FLNG facility itself will be 488m long and 74m wide, and when fully loaded will weigh around 600,000 tonnes. Some 260,000 tonnes of that weight will consist of steel - around five times more than was used to build the Sydney Harbour Bridge.

PRELUDE

	• Once constructed the facility will be towed to location where it will be permanently moored by 4 groups of massive mooring chains in 250m-deep water. Each mooring chain held to the sea floor by suction piles the size of small houses. • The FLNG facility has been designed to withstand severe weather, even a Category 5 cyclone. Safety of the FLNG facility has been paramount during its design, and its safety is on a par with modern offshore oil and gas facilities. • The Prelude FLNG facility is expected to stay moored at location for 25 years, and is expected to produce at least 3.6 MTPA of LNG as well as LPG and condensate for export. • In the operational phase Prelude is predicted to support around 350 direct jobs and 650 indirect jobs.
Relevant Strategies Being Pursued	• Shell is committed to having a positive impact in the countries in which they operate. This involves creating employment and supply chain opportunities in the countries in which they operate. • Shell is seeking to provide full, fair and reasonable opportunity for Australian industries to participate in Shell operations. • Onshore support services are likely to be spread between Broome, Darwin and Perth. • Shell will invest in training in WA and Perth will be established a centre for operational excellence in FLNG. • Construction of the FLNG substructure started in October 2012 in South Korea, at one of the few shipyards in the world big enough to build it.
AIPP Details	• The Prelude AIPP is widely referenced. • Its content is believed to be entirely conventional in nature and would commit Shell and their contractors to maximise the opportunities for Australian businesses to be involved in providing materials, equipment, labour, plant and professional skills.
Working with the ICN	• As the Prelude FLNG Project progresses, Shell will ensure Australian contractors and suppliers are aware of opportunities by working with the ICN in Western Australia. • Prelude is fully featured on ICN Gateway.
Working with ProjectConnect	• As the Prelude FLNG Project progresses, Shell will ensure Australian contractors and suppliers are aware of opportunities by working with ProjectConnect. • Prelude is currently featured on the ProjectConnect website.

WHEATSTONE

Developer	• Chevron Australia Pty Ltd
Partners	• The Wheatstone Project is a joint venture between the Australian subsidiaries of Chevron, Apache, Kuwait Foreign Petroleum Exploration Company (KUFPEC), and Kyushu Electric Power Company together with PE Wheatstone Pty Ltd.
Location	• The Wheatstone and nearby Iago natural gas resources are located about 200 kilometers north of Onslow off Western Australia's Pilbara coast. • Landfall is 12 kilometers west of Onslow on the Pilbara coast of Western Australia where the LNG and domestic gas plants will be built.
Development Timeframe	• A final investment decision to proceed with the Wheatstone Project was made in September 2011, with construction started in December that same year. • Wheatstone is scheduled to be operational in 2015
Key Features	• The foundation project includes two LNG trains with a combined capacity of 8.9 MTPA and a domestic gas plant. • Eighty percent of the Wheatstone Project's foundation capacity will be fed with natural gas from the Wheatstone and Iago field operations, which are operated by Chevron. The remaining 20 percent of gas will be supplied from the Apache operated Julimar and Brunello fields. • Local businesses are estimated to benefit by the creation of 6,500 direct and indirect jobs during peak construction and the expenditure of $17 billion on Australian goods and services over the life of the project. • Since construction began in late 2011 the Wheatstone Project has committed more than $11 billion dollars in services and supply contracts to Australian businesses. • The majority of the work under these contracts will be carried out in Western Australia, including a significant proportion in Onslow, creating employment and sub-contracting opportunities. Chevron aims to continue to work closely with their contractors, government and regional stakeholders to enhance local employment and training opportunities, in addition to opportunities for small business to participate in the project. • Chevron estimate that the 40 to 50 years of continuous operations will generate great wealth and opportunity through ongoing operations and maintenance jobs and services, the development of niche technologies. • Beyond construction, Chevron’s focus is predicted to move to higher skilled long-term jobs in LNG and domestic gas plant operations, maintenance and logistics support, along with continuing exploration and appraisal to support expansion of facilities once established.
Relevant Strategies Being Pursued	• Chevron Australia is committed to local supplier opportunities and active support for Australian industry participation is one of the project's core business philosophies.

WHEATSTONE

- The Wheatstone Project has also committed itself to utilizing the resources of the ICN in Western Australia and other sources including ProjectConnect, Supplybase VRS (now FPS), Pilbara Business Capability Register (ePilbara) and other vendor registration systems, as appropriate, to identify those Australian companies able to supply goods or services commensurate with the quality, safety, environmental, reliability and delivery standards and objectives of the Project.
- Chevron is to provide information and facilitate briefings to Australian industry in order for local suppliers to have adequate time to identify potential opportunities.
- Encouragement of offshore manufacturing and service companies, who have leading edge technology applicable to the Wheatstone Project, to establish local facilities or manufacturing licensees and to aid in technology transfer.
- Assistance to Australian industry in forming strategic joint ventures or alliances with offshore companies.
- Ensure that Australian design, engineering, manufacturing, construction and project management capabilities are considered when preparing scopes of work to enhance Australian industry opportunities, without impacting Wheatstone Project's safety, environment, reliability, quality, cost or schedule objectives.
- Establish a supplier diversity program that works with regional organisations, indigenous organisations and the ICN to establish links between the Wheatstone Project and local business, including capability register and capacity building activities.
- In December 2008, Chevron selected a preferred site at Ashburton North approximately 12 kilometers west of Onslow on the Pilbara coast of Western Australia as the location for the LNG and domestic gas plant. The site was selected after a 12 month study and extensive community consultations to find the location most suitable from environmental, community, social impact and engineering aspects.

AIPP Details

- Chevron has made the Wheatstone AIPP publically available.
- Active support for Australian industry participation is one of the Wheatstone's Project's core business policies.
- Chevron as operator is committed to producing an AIPP and suitable policy to enact the AIPP.
- Facilitation of contractor and subcontractor alignment with their policies, by including the AIPP requirements in all contracts and purchase orders. AIPP requirements shall be a condition that is reflected in all subcontracts and contractor placed purchase orders.
- Establish a measurement system to track and report the extent to which Australian industry is utilised.

WHEATSTONE

Working with the ICN

- The Wheatstone Project is utilising the vendor identification services of the ICN of Western Australia to provide qualified information on Australian suppliers and to advertise upcoming procurement and contract opportunities.
- Structural impediments to competitive Australian Industry participation, such as infrastructure and skills shortages will be identified and with ICN WA support, make industry and government aware of any such perceived limitations.
- Wheatstone is fully featured on ICN Gateway.

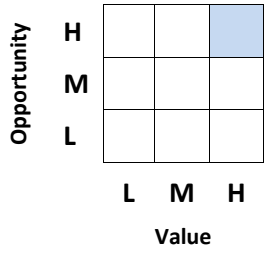
Working with ProjectConnect

- The Wheatstone Project is utilising the vendor identification services of ProjectConnect to provide qualified information on Australian suppliers and to advertise upcoming procurement and contract opportunities.
- ProjectConnect has to date provided a full list of contracting and supply opportunities for the project phase of Wheatstone.

APPENDIX 2 Opportunity Mapping Breakdown

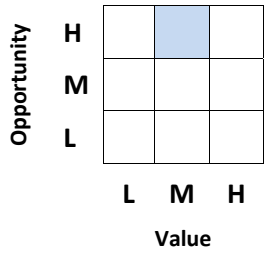
This Appendix provides a more detailed breakdown of the assessment provided in Exhibit 13.2.

High Opportunity + High Value



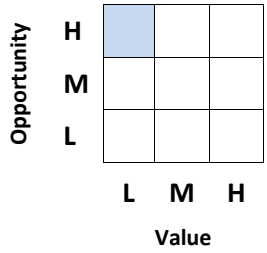
15	Fuel farm equipment and general maintenance
45	Temporary personnel

High Opportunity + Medium Value



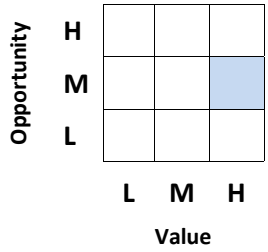
02	Biological survey and vegetation management
04	Catering and domestic services
06	Civil works
13	Firefighting and systems maintenance
14	Flange management services
18	General industrial consumables
20	Hire plant, equipment and associated services
26	Maintenance / repair of (emergency) diesel gen's
27	Maintenance coating services
28	Maintenance services
29	Mechanical inspection services
30	NDT services
36	Provision of maintenance systems
37	Pump repair
38	Rigging and lifting supply and service
47	Waste management services

High Opportunity + Low Value



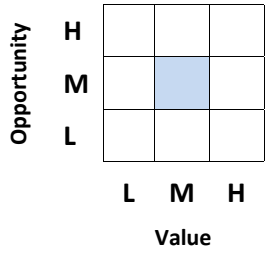
01	Aerial surveying
08	Consultancy and inspection for electrical equipment
10	Cranes and lifting equipment
19	General plumbing maintenance
21	Hydraulic and pneumatic services and materials
24	Laboratory services
25	Machinery lube oil analysis services
31	Occupational hygiene services
32	Onsite machining services
39	Rope access inspection services
40	Scaffold supply and/or hire
41	Security services
43	Supply of personal protective equipment

Medium Opportunity + High Value



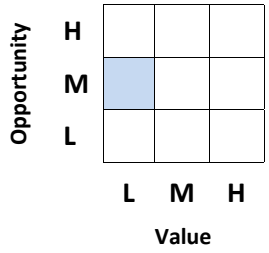
03	Brownfield project execution services
46	Valve maintenance

Medium Opportunity + Medium Value



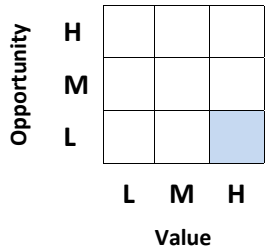
07	Consolidated environmental services
12	Engineering service contract
23	IT and telecommunication services
34	Predictive maintenance and condition monitoring
35	Provision of health care services

Medium Opportunity + Low Value



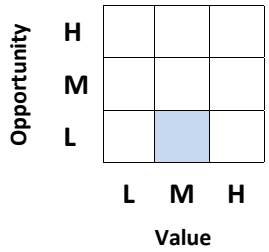
05	Cathodic protection services
09	Crane services (including maintenance)
16	Fundamental computer based training modules

Low Opportunity + High Value



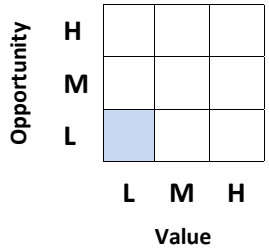
17	Gas turbine and compressor maintenance

Low Opportunity + Medium Value



42	Specialist compressor services – air compressors
44	Supply pump spares

Low Opportunity + Low Value



11	Engineering data portal/warehouse
22	International freight forwarding service
33	Planning system for LNG production

APPENDIX 3 Sourcing Techniques

This Appendix provides a more detailed breakdown of the assessment provided in Exhibit 13.3.

Basic Sourcing	Screening	Prequalification
16 Fundamental computer based training modules 18 General industrial consumables 19 General plumbing maintenance 20 Hire plant, equipment and associated services 22 International freight forwarding service 24 Laboratory services 25 Machinery lube oil analysis services 32 Onsite machining services 33 Planning system for LNG production 37 Pump repair 40 Scaffold supply and/or hire 41 Security services 43 Supply of personal protective equipment 44 Supply pump spares 45 Temporary personnel	01 Aerial surveying 05 Cathodic protection services 08 Consultancy and inspection for electrical equipment 09 Crane services (including maintenance) 10 Cranes and lifting equip 11 Engineering data portal/warehouse 13 Fire fighting and systems maintenance 14 Flange management 21 Hydraulic and pneumatic services and materials 23 IT and telecommunication services 26 Maintenance and repair of (emergency) diesel gen's 27 Maintenance coating services 29 Mechanical inspection services 30 NDT services 31 Occupational hygiene services 34 Predictive maintenance and condition monitoring 35 Provision of health care services 36 Provision of maintenance systems 38 Rigging and lifting supply and service 39 Rope access inspection services 42 Specialist compressor services – air compressors	02 Biological survey and vegetation management 03 Brownfield project execution services 04 Catering and domestic services 06 Civil works 07 Consolidated environmental services 12 Engineering service contract 15 Fuel farm equipment and general maintenance 17 Gas turbine and compressor maintenance 28 Maintenance services 46 Valve maintenance 47 Waste management services

APPENDIX 4 Evaluation Methodology

This Appendix provides a more detailed breakdown of the assessment provided in Exhibit 13.4.

Price	Cost	Value For Money	Total Cost of Ownership
06 Civil works 18 General industrial consumables 19 General plumbing maintenance 20 Hire plant, equipment and associated services 21 Hydraulic and pneumatic services and materials 22 International freight forwarding service 40 Scaffold supply and/or hire 41 Security services 44 Supply pump spares	01 Aerial surveying 02 Biological survey and vegetation management 05 Cathodic protection services 07 Consolidated environmental services 08 Consultancy and inspection for electrical equipment 09 Crane services (including maintenance) 14 Flange management services 16 Fundamental computer based training modules 23 IT and telecommunication services 24 Laboratory services 25 Machinery lube oil analysis services 28 Maintenance services 29 Mechanical inspection services 30 NDT services 32 Onsite machining services 33 Planning system for LNG production 34 Predictive maintenance and condition monitoring 37 Pump repair 38 Rigging and lifting supply and service 39 Rope access inspection services	03 Brownfield project execution services 04 Catering and domestic services 11 Engineering data portal/warehouse 12 Engineering service contract 13 Fire fighting and systems maintenance 15 Fuel farm equipment and general maintenance 17 Gas turbine and compressor maintenance 26 Maintenance and repair of (emergency) diesel gen's 27 Maintenance coating services 31 Occupational hygiene services 35 Provision of health care services 36 Provision of maintenance systems 42 Specialist compressor services – air compressors 43 Supply of personal protective equipment 45 Temporary personnel 46 Valve maintenance 47 Waste management services	10 Cranes and lifting equipment

APPENDIX 5 Typical Contract Durations

This Appendix provides a more detailed breakdown of the assessment provided in Exhibit 13.5.

Short (1-2 Years)	Medium (2-3 Years)	Long (3-5 Years)
01 Aerial surveying	02 Biological survey and vegetation	04 Catering and domestic services
06 Civil works	03 Brownfield project execution services	05 Cathodic protection services
08 Consultancy and inspection for electrical equipment	07 Consolidated environmental services	11 Engineering data portal/warehouse
10 Cranes and lifting equipment	09 Crane services (including maintenance)	15 Fuel farm equipment and general maintenance
16 Fundamental computer based training modules	12 Engineering service contract	17 Gas turbine and compressor maintenance
18 General industrial consumables	13 Fire fighting and systems maintenance	23 IT and telecommunication services
19 General plumbing maintenance	14 Flange management services	28 Maintenance services
20 Hire plant, equipment and associated services	24 Laboratory services	33 Planning system for LNG production
21 Hydraulic and pneumatic services and materials	25 Machinery lube oil analysis services	34 Predictive maintenance and condition monitoring
22 International freight forwarding service	26 Maintenance and repair of (emergency) diesel gen's	36 Provision of maintenance systems
32 Onsite machining services	27 Maintenance coating services	44 Supply pump spares
38 Rigging and lifting supply and service	29 Mechanical inspection services	47 Waste management services
39 Rope access inspection services	30 NDT services	
40 Scaffold supply and/or hire	31 Occupational hygiene services	
41 Security services	35 Provision of health care services	
45 Temporary personnel	37 Pump repair	
	42 Specialist compressor services – air compressors	
	43 Supply of personal protective equipment	
	46 Valve maintenance	

APPENDIX 6 Category Summary

We have provided a summary in this Appendix of the key characteristics and attributes for each of the 47 ICN categories of goods and services found in their report as referenced in this Guide.

No	ICN Category	Opportunity Rating	Value Rating	Sourcing Approach	Evaluation Approach	Contract Duration
01	Aerial surveying	H	L	Screening	Cost	Short
02	Biological survey and vegetation management	H	M	Prequalification	Cost	Medium
03	Brownfield project execution services	M	H	Prequalification	VFM	Medium
04	Catering and domestic services	H	M	Prequalification	VFM	Long
05	Cathodic protection services	M	L	Screening	Cost	Long
06	Civil works	H	M	Prequalification	Price	Short
07	Consolidated environmental services	M	M	Prequalification	Cost	Medium
08	Consultancy and inspection for electrical equipment	H	L	Screening	Cost	Short
09	Crane services (including maintenance)	M	L	Screening	Cost	Medium
10	Cranes and lifting equipment	H	L	Screening	TCO	Short
11	Engineering data portal/warehouse	L	L	Screening	VFM	Long
12	Engineering service contract	M	M	Prequalification	VFM	Medium
13	Fire fighting and systems maintenance	H	M	Screening	VFM	Medium
14	Flange management services	H	M	Screening	Cost	Medium
15	Fuel farm equipment and general maintenance	H	H	Prequalification	VFM	Long
16	Fundamental computer based training modules	M	L	Basic Sourcing	Cost	Short
17	Gas turbine and compressor maintenance	L	H	Prequalification	VFM	Long
18	General industrial consumables	H	M	Basic Sourcing	Price	Short
19	General plumbing maintenance	H	L	Basic Sourcing	Price	Short
20	Hire plant, equipment and associated services	H	M	Basic Sourcing	Price	Short
21	Hydraulic and pneumatic services and materials	H	L	Screening	Price	Short

No	ICN Category	Opportunity Rating	Value Rating	Sourcing Approach	Evaluation Approach	Contract Duration
22	International freight forwarding service	L	L	Basic Sourcing	Price	Short
23	IT and telecommunication services	M	M	Screening	Cost	Long
24	Laboratory services	H	L	Basic Sourcing	Cost	Medium
25	Machinery lube oil analysis services	H	L	Basic Sourcing	Cost	Medium
26	Maintenance and repair of (emergency) diesel gen's	H	M	Screening	VFM	Medium
27	Maintenance coating services	H	M	Screening	VFM	Medium
28	Maintenance services	H	M	Prequalification	Cost	Long
29	Mechanical inspection services	H	M	Screening	Cost	Medium
30	NDT services	H	M	Screening	Cost	Medium
31	Occupational hygiene services	H	L	Screening	VFM	Medium
32	Onsite machining services	H	L	Basic Sourcing	Cost	Short
33	Planning system for LNG production	L	L	Basic Sourcing	Cost	Long
34	Predictive maintenance and condition monitoring	M	M	Screening	Cost	Long
35	Provision of health care services	M	M	Screening	VFM	Medium
36	Provision of maintenance systems	H	M	Screening	VFM	Long
37	Pump repair	H	M	Basic Sourcing	Cost	Medium
38	Rigging and lifting supply and service	H	M	Screening	Cost	Short
39	Rope access inspection services	H	L	Screening	Cost	Short
40	Scaffold supply and/or hire	H	L	Basic Sourcing	Price	Short
41	Security services	H	L	Basic Sourcing	Price	Short
42	Specialist compressor services – air compressors	L	M	Screening	VFM	Medium
43	Supply of personal protective equipment	H	L	Basic Sourcing	VFM	Medium
44	Supply pump spares	L	M	Basic Sourcing	Price	Long
45	Temporary personnel	H	H	Basic Sourcing	VFM	Short

No	ICN Category	Opportunity Rating	Value Rating	Sourcing Approach	Evaluation Approach	Contract Duration
46	Valve maintenance	**M**	**H**	**Prequalification**	**VFM**	**Medium**
47	Waste management services	**H**	**M**	**Prequalification**	**VFM**	**Long**

APPENDIX 7 Integrated Service Contractors

As discussed in Section 13 there are a number of contractors who are able to offer multi-disciplined integrated service offerings to clients *. A list of contractors with declared experience of Integrated Service contracting in upstream Oil and Gas is provided below **.

Contractor	Client	Location	Scope
AGC	Apache	Varanus Island	Integrated services maintenance contract
Clough AMEC	Woodside	Offshore assets	Maintenance
	ConocoPhillips	Bayu-Undan	Operations and maintenance services
	Chevron	Barrow Island	Engineering services
Monadelphous	Woodside	Pluto	Maintenance services
	QGC	Curtis	LNG Plant maintenance services
Transfield Worley	Woodside	Karratha	Brownfield project and maintenance services
	Shell	Malampaya	Integrated services
UGL	BHPB	Upstream assets	Whole-of-life services
Wood Group PSN	Shell	Prelude	Maintenance management system

* Sourced from 2013 ICN report on “Opportunities for Small to Medium Enterprises” for companies potentially interested in operations, maintenance and facilities management of onshore Australian LNG facilities.

** Other Integrated Service providers exist for downstream oil and gas and for other sectors with asset maintenance requirements.

AKROM

Akrom Pty Ltd
Level 24, 77 St Georges Terrace
Perth WA 6000
Australia
+61 1300 72 10 72
info@akrom.com.au
www.akrom.com.au