

Deloitte.

The good, the bad and the ugly
The changing face of
Australia's LNG production

Authors – Stephen Reid and Geoffrey Cann



Contents

Introduction	4
The good: What worked well	6
The bad: What they'd do differently	8
The ugly: What the industry must never do again	10
The next level: Innovation and collaboration	13
The case for catalytic collaboration	16
The future: Breaking bulk and becoming customer-centric	18
Conclusion	19
End notes	20

Introduction

Australia has been the epicentre of LNG development for the last decade. Within a period of approximately five years, fourteen liquefaction trains have been developed almost simultaneously. This activity is expected to bring the nation's total to twenty one when completed.¹

The scale of this build-out would be impressive under any economic conditions, but it is particularly notable considering it occurred at a time when many companies and governments had curtailed capital spending in the wake of the global financial crisis. However, commitment, long-term vision and geographical proximity to the growing Asian market allowed Australia to continue to develop its LNG infrastructure when others stopped. Now, with many of these long-term projects approaching operational phase, Australia has many lessons to share with the rest of the world, particularly since oil and gas (O&G) development in many countries is shifting toward unconventional resources such as shale gas and coal seam gas.

Deloitte interviewed ten Australian LNG leaders who were either involved directly in managing these projects or who have a broad industry view through their roles as consultants or advisors.

Through these anonymised interviews, they provided candid insights into what they'd do differently if they could; what the industry must never do again; and what leading practices have emerged that, in their view, should become part and parcel of any LNG project going forward. They also provided some thoughts on how innovation and collaboration can help take LNG to the next level over the coming years.

Keep in mind that within every collective 'lessons learned' there were exceptions. Some projects, for instance, have been delivered in a timely manner and close to budget despite the general concerns expressed by survey participants about excessive cost escalations and schedule over-runs. The insights presented herein are intended to paint a picture of the Australian LNG experience in very broad strokes, and in no way are intended to be comprehensive.



The good: What worked well

Survey participants pointed to some strategies, approaches and mindsets that, in their view, should be incorporated into future LNG projects as leading practices.

These *'things we must do again'* are:

① Stimulate innovation and embrace new thinking —

Coal seam gas to LNG is a bold undertaking, with Australian projects largely pioneering the process. Industry-leading innovations in infrastructure design, process improvement, and water stewardship, among others, have paved the way for further development of unconventional deposits around the world. Today, this same technological prowess and ability to embrace new thinking are driving improvements in safety, performance and cost-effectiveness.

Main take-away: The O&G industry is a high-tech industry. Innovation has always been – and will continue to be – critical to ongoing viability and prosperity.

② Focus on employee conditions and engagement —

Australia is a sparsely populated nation with strict labour and immigration laws – a situation that inherently creates a tight market for skilled labour. To manage these talent constraints, developers and contractors have paid considerable attention to creating rewarding work environments and attractive incentive schemes. Some companies have become world-class in recognising the commitment of employees and understanding their desires both in terms of individuals and their families.

Main take-away: More than money matters in attracting and retaining talent. The LNG projects in Australia have pioneered the use of technology to improve work conditions, such as establishing operation centres in cities and managing activities in distant locales by remote control, thus affording employees and their families greater opportunities to live in desirable locations.

3 Amass an excellent health, safety and environmental record —

O&G explorers and producers in Australia have generally agreed not to compete adversely on safety and have been working together to maintain the integrity of gas infrastructure and to preserve the environment and property.ⁱⁱ Examples include driver training and heavy haulage standards, wellhead leak management, fatigue management, bushfire safety and mutual emergency response capability.ⁱⁱⁱ Several LNG projects boast excellent safety records, having logged millions of work hours without recordable injuries, even during peak construction periods.

Main take-away: The natural gas industry in Australia is highly regulated. State and federal governments maintain a keen focus on safety, implementing and enforcing a number of health, safety and environmental requirements. Despite the perception some of these regulations are onerous, O&G companies have risen to the challenge of meeting them, often exceeding government standards, on their own. This collective focus on health, safety, and environment has paid off in improving public perception and in helping the sector to earn its social licence to operate.

The bad:

What they'd do differently

Everything seems clear in retrospect, and this premise is amplified several fold in the course of multi-year, multi-billion-dollar LNG projects. With this in mind, survey participants shared many valuable insights regarding 'what they'd do differently if they had their time again.'

① Better manage the implications of concurrent projects —

The industry did not think through or forecast very well, the consequences of several independent projects prosecuting a similar resource in parallel. In terms of post Final Investment Decision (FID) construction, collaboration among companies was virtually non-existent and this led to a dramatic overbuilding of infrastructure. For example, the three large LNG projects in Queensland don't even share a road.

Main take-away: Companies can become single-minded in their quest to capitalise upon an opportunity to deliver value to their shareholders. When two or more companies are building plants simultaneously, the government can play a role in securing the public interest. Policymakers can do this by imposing conditions precedent on the issue of mining rights, such as to require the sharing of land-use corridors. And if companies cannot obtain cooperation amongst themselves, they can seek to share each other's infrastructure by invoking the existing federal access regime, with a view to imposing an access outcome.

② Take a long-term, collaborative approach to working with local communities —

In some Australian states, proposed LNG projects faced significant opposition from local communities based on health, safety and environmental concerns. In order to assuage these concerns, the government layered on regulation after regulation so projects had higher hurdles to overcome.

Main take-away: The industry could have reduced this regulatory burden, accelerated project delivery, and minimised non-recoverable costs by taking a longer-term, collaborative approach to working with local communities. The effectiveness of taking a shrewd approach to community relations and development is well documented.

For instance, the PNG LNG project in Papua New Guinea has been recognised for its commitment to training the local workforce, inviting input from community leaders, and addressing facility siting concerns.^{v, vi} This collaborative approach garnered great support among indigenous communities, making it one of the few LNG projects worldwide to be completed ahead of schedule.^{vii}

3 Build a trading function from the outset —

At the inception of the Australian LNG projects, most LNG was sold to known buyers through stable, predictable long-term contracts that were pegged to oil prices. Thus, there was little need to be proactive in developing spot markets or in building trading functions to hedge the output or to enable portfolio selling. Fast-forward ten years and long-term, oil-linked contracts are depressed, and operators increasingly need to find new buyers as well as to trade LNG cargoes to meet their commitments and optimise their assets. In addition, those that took the view that it was too expensive to hedge are thinking twice about their decisions in light of the oil price collapse. This is especially the case if they didn't consider what their balance sheets and credit ratings would need to look like in order to pursue other projects and to continue to create value for their shareholders. A trading function could have played an important role in providing a long-term view and a more holistic approach to managing risk and optimising assets over time.

Main take-away: LNG operators will increasingly need to consider market and credit risk, alongside operational and funding/liquidity risk. They will also require a trading function capable of executing risk-mitigation and asset-optimisation strategies. The LNG sector hasn't historically seen a need for such a function, so developing these capabilities is a relatively new proposition. There is presently a good opportunity for the O&G industry to shorten its learning curve by soliciting input from other sectors, such as power and mining, which have already developed robust trading mechanisms.

4 Manage contractors more effectively —

Several survey participants called out the need for more effective governance of engineering, procurement and construction (EPC) contractors from the perspectives of contracts, risk, and finance. Many companies began with one contracting strategy, mainly a lump-sum approach, and then switched to another model mid-stream, mainly a cost-plus approach. In general, neither approach succeeded in controlling costs and producing the desired outcomes because companies did not define the scope well to begin with, nor did they modify their projects to accommodate the shift in contracting strategies. In addition, contractors were generally well prepared to identify scope changes and to write change requests whenever anything slightly deviated from the contract, whereas developers were generally less prepared to sort through the change orders and to challenge questionable items.

Main take-away:

Greater rigour is required in defining the project scope tightly, processing change requests quickly, and resolving discrepancies earlier before costs become extreme and the schedule drags out so long. If they are to control costs, LNG developers must have active managerial teams, sufficient administrative staff, and remediation processes in place to manage contractors with more diligence.

The ugly: What the industry must never do again

Drawing upon their ‘lessons learned,’ survey participants outlined some practices and attitudes that, in their view, should be avoided on future LNG projects.

These ‘*things we must never do again*’ are:

① **Never get swept up in a groundswell of enthusiasm and a ‘get it done at any cost’ mentality —**

High oil prices at the inception of the LNG construction boom in Australia cultivated the view that hitting schedule was more important than managing expenses, since companies largely expected to recover any excess costs by delivering early. This limited perspective led to major inefficiencies and a lack of focus on productivity outcomes.

Main take-away: Establishing a productivity-based culture is imperative. Projects in other parts of the world now have an opportunity to learn from Australia’s pain around cost escalation and schedule over-runs by focusing on productivity and asset efficiency right from the outset, especially pre-FID. This might involve considering smaller-scale projects, taking a closer look at using brownfields and existing infrastructure, or thinking innovatively about leveraging existing transport methods, such as rail.

② **Never underestimate the industry’s collective impact upon local markets —**

There is a high probability that undertaking several major capital projects within the same geographic area will create resource scarcities, which in turn will drive up costs to unsustainable levels. Yet, in Australia, this likelihood was largely ignored. As a smaller nation, Australia had inherent resource scarcities, particularly in terms of labour. Additionally, LNG companies did not give a great deal of forethought to how stiff competition among multiple operators would affect local wage rates. This resulted in an ‘arms race’ of sorts in assuring access to scarce resources, with wage rates soaring to astronomical levels. How high is astronomical? As described by one survey participant, a journeyman carpenter, whose task was to build forms for pouring concrete, commanded AU\$250,000 per year at the height of the building activity.

Main take-away: The industry must think very carefully about the long-term impact of its activities on local markets for labour, equipment, and services. While companies are often legally prohibited from collaborating with each other in terms of labour, they could work more closely with government agencies and labour unions to create sustainable wage and talent-development frameworks in an effort to avoid uncontrollable cost escalations that erode shareholder value.

3 Never use a legally driven framework as the primary method for assuring access to the resource —

In Australia, as in many other nations, the gas belongs to the state. While landowners cannot bar access to the resource, they are entitled to compensation. Instead of approaching landowners as business partners, some companies relied on a purely technical, legal approach for securing the right-of-way for development. This impersonal approach aggravated communities and inflamed political sentiment against the O&G industry—so much so that Victoria and New South Wales imposed tough restrictions on gas development.

Main take-away: The industry would be better served by setting the legal framework aside at first, and instead approaching landowners and other stakeholders as partners in business and friendly neighbours in the community.

4 Never go it alone —

LNG developers in Australia mainly viewed their competitors as being the organisations down the road, and they raced each other to build infrastructure at almost any cost.

Main take-away: Companies in the O&G industry must realise competition is global, not local. Expanding spot markets and new technologies such as floating re-gasification units will make LNG cargoes even more fungible. Had they taken this view from the outset, developers in Australia could have shared more infrastructure, thus minimising costs and better positioning themselves to compete more effectively with the rest of the world.

'If we're ever going to do these projects again, the successful ones must have a holistic framework for managing the various types of risk.'



The next level: Innovation and collaboration

Given current price conditions, O&G companies are working feverishly to take costs out of their LNG operations in Australia, and they are succeeding through a number of innovations.

Survey participants pointed to floating LNG and drone surveillance of wells, along with the automatic issuance of repair tickets, as excellent examples of how the sector is leveraging technology to improve efficiency. Through advancements like these, unconventional on-shore gas well delivery is down to about 500 hours today.^{viii} By some estimates, it could be reduced even further, down to approximately 100 hours, with the adoption of manufacturing techniques like those used in the automotive industry.^{ix} Survey participants additionally emphasised the industry has plenty of room to innovate further. For example, the construction timelines on these projects were so long that the original designs did not fully incorporate digital and mobile technologies, or the capabilities of the sharing economy, which are taken for granted today.

LNG operators are now moving rapidly to capitalise upon analytics, hand-held devices, the Internet of Things, sharing technology, wearables, 3D printing and adaptive manufacturing, which collectively hold the promise of even greater productivity and cost savings.

Nonetheless, companies must go beyond operational innovation in order for the industry to survive the downturn, and for proposed projects elsewhere to proceed successfully. This means innovating in areas such as community relations, human resources, general and administrative processes, supply chain and procurement, and more. Examples include potentially using mobile sharing technologies to alleviate capability shortages, such as an app that would allow companies to view the availability of rental equipment across multiple service providers in real-time. Or, avoiding excessive downtimes by revisiting the terms of work contracts.

While it may sound inconsequential on the surface, misalignment of work contracts with construction periods caused significant delays and cost escalations in Australia.

On many projects, labour contracts expired before the work was completed, which gave labour organisations considerable leverage in renegotiating rates and terms. Also, Christmas and summer vacation periods coincide in Australia. Since virtually everyone goes on holiday at the same time, major capital projects typically shut down for 2–3 weeks each year. Over a four-year program, this practice translated into a 90-day delay. New projects in Australia, or elsewhere in the world, could potentially avoid these issues by taking a fresh approach to labour negotiations and contract structuring.

Innovation also extends to collaboration, with new methods and constructs being sorely needed for working together, sharing knowledge, and inviting input from other sectors.

Here are some potential areas for collaboration cited by survey participants:



Supplier collaboration:

The industry generally views facility construction and the drilling of oil and gas wells as a capital-based, project-driven exercise, as opposed to a manufacturing operation. The industry, in other words, drills 10,000 different wells as opposed to drilling one well 10,000 times. O&G companies could potentially benefit from collaborating with their suppliers and giving them greater visibility into their plans and requirements—much as suppliers in the auto industry have visibility into their customers' vehicle designs and manufacturing schedules. This could help bring down costs by minimising the need for customisation, enabling parts to be mass produced, and facilitating timely delivery.



Service provider collaboration:

The three LNG projects in Queensland rely on the same pool of service providers to perform well inspections. However, each LNG operator imposes different safety standards on these providers, such as acceptable routes and speed limits. As a result, providers not only must adhere to three separate driving policies, but also must install three different types of monitoring technologies. Such misalignment obviously impacts cost and effectiveness.



Inter-company collaboration:

In Australia, there is no widely accepted standardised contract for inter-company transactions in the O&G industry. Nearly every interaction for sharing facilities or selling gas to each other is a one-off agreement, which requires separate legal services and manual coding and processing. A little industry collaboration could go a long way in enabling companies to standardise and automate these processes and therefore lower costs. Similarly, each of the LNG projects in Queensland has a different standard for how deep to entrench pipe. Design incongruity like this translates into substantial costs, which could be lowered if companies could agree to use either the government standard or their own collective one. There may also be opportunities for asset sharing, such as in the case of a specialty rig or high-value spare part. Since many of the projects in Australia are joint ventures, survey participants acknowledged this would be a complex interaction commercially. Nonetheless, they suggested LNG developers might be more open to this type of arrangement in today's ultra-cost-conscious environment. Another collaboration possibility involves the use of supply and support vessels. 'Why must every project have its own helicopters and boats?' inquired one survey participant. Bigger vessels, the costs of which could be borne by two or more operators, could potentially be used to service multiple offshore projects.



Industry collaboration:

In this, LNG developers in Australia are making progress. Due to cost pressures, as well as to government mandate in some instances, a few companies regularly convene to share safety best practices and to discuss public policy and ways for the industry to maintain its social licence to operate. Some companies also have started to approach the mining industry and indigenous communities with regard to building and sharing emergency-response capabilities.



Government collaboration:

In general, the industry does not communicate with a unified voice regarding government regulatory activities. On future projects, there is an opportunity for industry participants to come together and to agree upon codes of conduct upfront so they don't signal to the government that regulation is necessary. As existing projects move into the operating phase, there is also an opportunity to collaborate with regulators to assess if the requirements that were originally put in place are still relevant.

'The easiest time to get these projects going is when commodity prices are very strong; but it's also the hardest when they're strong, because labour comes at a premium.'



The case for catalytic collaboration

Oil and gas companies are acutely aware of the need to do better, and all of the LNG projects in Australia are pursuing a broad range of internal improvement efforts. They also understand no single enterprise can attain the magnitude of improvement required to combat current cost pressures. Many industry voices, from chief executives to industry trade groups and analysts, have identified industry collaboration and innovation as two of the keys to tackling the sector's cost and productivity issues. So, why didn't more collaboration take place?

Some survey participants said pride got in the way. In their quest to control their own destinies, LNG developers may have missed an opportunity to bring in experts in pipelines, water treatment, electricity generation and other specialties, which could have allowed them to focus more on what they're good at.

'The industry needs a catalyst, or an independent entity, to accelerate its collaboration efforts—with a focus on the highest impact areas, those that are deemed costly but not critical to competitive rivalry.'



In addition, the sector faced an even bigger barrier to collaboration than the desire for control. In Australia, as well as in most areas around the world, O&G companies are reluctant to talk to each other for fear of being charged with collusion. With antitrust laws tightening globally, this sensitivity, survey participants largely agreed, is well warranted. A potential, innovative solution, however, is to work through a 'catalyst,' or an independent entity that isn't invested in the projects themselves. This catalyst could serve as a repository of information for the purposes of identifying areas where working together would be in the highest and best interest of the community as well as project stakeholders. Areas of collaboration identified as having the greatest potential impact include regulatory compliance, produced water management, simplified contracting, common safety standards, and shared emergency response capabilities.

The future: Breaking bulk and becoming customer-centric

When queried about the future of LNG, several survey participants suggested supply side innovations that allow LNG to 'break bulk' and be delivered more flexibly and in smaller quantities will likely play a role in taking LNG to the next level over the next ten years. Floating LNG is expected to be a big part of this equation, as is further development of spot markets and trading operations around the world.

And, growth opportunities aren't limited to the supply side. Several survey participants believe demand-side developments, particularly greater use of LNG as a 'bridge fuel' or a complementary fuel to renewables in the power generation sector, will also play a role in taking LNG to the next level.

Another anticipated demand-side development is greater use of LNG among commercial and industrial (C&I) customers. In an effort to expand this market, some see the natural gas sector going down a similar path as the power sector in becoming more 'customer-centric.' For instance, this could involve setting up retail operations to market directly to C&I customers, possibly offering natural gas as a transport fuel or as part of broader energy-management solutions for manufacturers, fleet owners, mining operators, and other large energy users. Even if these exact scenarios don't come to pass, LNG companies would likely benefit from incorporating 'marketer and trader' components into the traditional explorer/producer model.

Regardless of how these possibilities play out, further development of financial markets, in terms of derivatives, commercial paper, and other instruments, will likely be needed to optimise LNG assets over time.

Conclusion

The general consensus is most Australian LNG projects will turn out to be positive endeavours over the long-term, but there will be a lot of pain in getting there. Nevertheless, the lessons learned from the largest simultaneous LNG build-out in the world will be invaluable to O&G companies as they move forward on future ventures.

With regard to both existing and future LNG projects, survey participants repeatedly stressed project owners could benefit the most from finding new and better ways to collaborate. Many of the things that haven't gone as well as planned for LNG developers in Australia could have been avoided through greater cooperation and a more standardised approach.

While regulatory and policy conditions differ greatly throughout the world, the first step to greater collaboration simply involves a change in perspective from viewing an LNG project in competitive isolation to seeing it as part of a vibrant, global energy ecosystem. From this perspective, survey participants stressed the long-term outlook for LNG is quite bright as the world continues to shift toward cleaner forms of energy. The current oil price downturn, while painful, could be a blessing in disguise since it is motivating operators to learn from the past and to innovate for the future, which in combination could take the sector to new heights.

'The explorer/produce model needs to evolve into an explorer/producer/marketer/trader model.'

End notes

- i. Deloitte internal research.
- ii. "QGC: O&G Explorers Must Focus on Safety," LNG World News, <http://www.lngworldnews.com/qgc-og-explorers-must-focus-on-safety-australia/>, accessed March 2, 2016.
- iii. Ibid.
- iv. Various featured company announcements, <http://www.lngworldnews.com/qgc-og-explorers-must-focus-on-safety-australia/>, accessed March 2, 2016.
- v. PNG LNG project is operated by ExxonMobil PNG Limited in co-venture with Oil Search Limited, National Petroleum Company of PNG, Santos Limited, JX Nippon Oil & Gas Exploration Corporation, Mineral Resources Development Company (representing landowners) and Petromin PNG Holdings Limited.
- vi. Laursen, Wendy, "ExxonMobil's PNG LNG Capability Grows," <http://www.maritime-executive.com/features/exxonmobils-png-lng-capability-grows>, posted January 1, 2015.
- vii. Ibid.
- viii. Deloitte internal research.
- ix. Deloitte internal research.

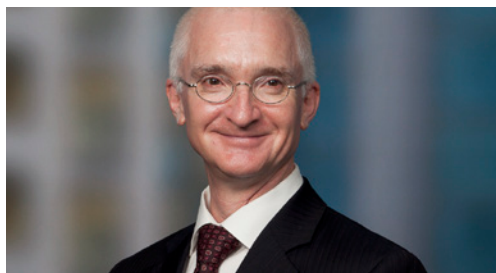
Contact us

For further information on how we can support your business needs, please contact one of the authors of this report.



STEPHEN REID

Energy & Resources Transaction Leader
02 9322 7654
stereid@deloitte.com.au



GEOFFREY CANN

National Director, Oil and Gas
07 3308 7125
gecann@deloitte.com.au



103

This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively the "Deloitte Network") is, by means of this publication, rendering professional advice or services.

Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/au/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

Deloitte provides audit, tax, consulting, and financial advisory services to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 150 countries, Deloitte brings world-class capabilities and high-quality service to clients, delivering the insights they need to address their most complex business challenges. Deloitte has in the region of 200,000 professionals, all committed to becoming the standard of excellence.

About Deloitte Australia

In Australia, the member firm is the Australian partnership of Deloitte Touche Tohmatsu. As one of Australia's leading professional services firms, Deloitte Touche Tohmatsu and its affiliates provide audit, tax, consulting, and financial advisory services through approximately 6,000 people across the country. Focused on the creation of value and growth, and known as an employer of choice for innovative human resources programs, we are dedicated to helping our clients and our people excel. For more information, please visit Deloitte's web site at www.deloitte.com.au.

Liability limited by a scheme approved under Professional Standards Legislation.

Member of Deloitte Touche Tohmatsu Limited

© 2016 Deloitte Touche Tohmatsu.

MCBD_MEL_04/16_052681