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Australia’s liquefied natural gas (LNG) sector has come a long way since 1989, when our first shipment left the Karratha Gas Plant in the Pilbara, bound for Japan. Since then the LNG market has changed dramatically with global demand rapidly increasing, new exporters, like the United States, entering the market, and transformative technologies, like floating LNG, revolutionising gas development.

While a rapid increase in supply has put downward pressure on LNG prices, and in turn, considerable strain on the industry, Australia can benefit from growing demand, particularly from Asia. In fact, by 2020, Australia is expected to overtake Qatar to become the world’s largest LNG exporter with 10 projects operating nationwide. China remains hungry for electricity to power its economic transformation, with its per capita electricity consumption still a third of that in the United States. Likewise, India is determined to provide electricity to around 240 million people who do not currently have such access.

This trajectory of long term growth, coupled with our strong focus on fostering innovation and new technologies, will help Australia to not only attain the title of the world’s largest LNG exporter, but also retain it for many years to come as we enter this golden age of gas.

Hon Josh Frydenberg MP
Minister for Resources, Energy & Northern Australia
It gives me great pleasure to introduce Inside Oil and Gas: Australia, a comprehensive report on Australia’s petroleum industry during an exciting period of transformation. With an unprecedented pipeline of major projects completed or well underway, Australia has secured its position as a global energy superpower, on track to become the leading exporter of LNG.

Despite the cyclical nature of the industry, Western Australia’s vast natural resources and extensive oil and gas experience mean its fundamentals are stronger than ever: A globally recognised, competitive and secure petroleum sector in close proximity to the world’s fastest-growing markets.

Highlighting investment opportunities, with in-depth contributions from petroleum industry and government leaders, this special report is an excellent platform to showcase Western Australia’s, and the nation’s, pivotal role in shaping our global energy future.

Bill Marmion BE MBA MLA
Minister for Finance; Mines and Petroleum
JOIN THE CONVERSATION

Australia

Additional full-feature interviews from our Australia 2016 Report can be accessed on EnergyBoardroom, the premier website for C-Level executives, consultants and state actors in the pharmaceuticals and life sciences sector, alongside hundreds of exclusive interviews featuring the main movers and shakers of the industry, free country reports and sector insights supplemented by the latest news from global markets.

AMPLIFIED CONTENT

H.E. UNNI KLØVSTAD – Norwegian Ambassador to Australia

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DIEGO BERAZATEGUI – Managing Director, Akrom, Australia

LOUI KANNIKOSKI – Founder & MD, Bhagwan Marine, Australia

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IN BRIEF

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Ken Fitzpatrick of @NERAnetwork talks commercializing innovation in #Australia http://buff.ly/1U9GjPi #energy

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1 trillion AUD added to Australia’s GDP as a result of Chevron’s projects” @LNG18Perth @Chevron
Change is afoot in Australia. Commodity price and demand fluctuations, growing competition from US shale, and a general market slowdown has fundamentally altered the rules of the game for Australian oil and gas. The factors that contributed to the reliable growth of the industry over the last 25 years remain; huge natural gas reserves, a progressive business climate, proximity to key Asian markets, and technological innovation. However, these new challenges have ensured a paradigm shift and the beginning of a new era for the industry.

Anticipating the upturn in demand for LNG in the coming decades, especially from developing economies in Asia, Australia has invested USD 200 billion in a number of ‘mega projects’ that it hopes will position the nation as an LNG superpower. Additionally, the infrastructure and technology is now in place to capitalize on Australia’s shale gas reserves and help supply these LNG plants. Perth, the capital of Western Australia, has developed into a thriving centre of hydrocarbons expertise and the typically Australian collaborative approach between government, the private sector, and research institutions is paying dividends in terms of developing new technology to harness the country’s natural resources.

This report paints a detailed picture of the cornucopia of opportunities and challenges in Australian oil and gas and the diverse range of actors involved; from passionate officials keen to wave the flag for their industry or region, technological pioneers from the world of academia, Juniors with serious ambitions, and Majors adapting to the new normal.
LNG’S GREAT TRAILBLAZER

Preface: Australia’s Energy Minister discusses the mind-blowing growth of the country’s LNG industry while outlining government initiatives to full capitalize on this resource.

EBR: Back in 1998, Australia possessed only one LNG project: the North West Shelf. Since then, the country’s LNG industry has experienced tremendous change. As the commonwealth minister with responsibility for resources and energy, what does this formidable development mean for Australia and its citizens?

HON. JOSH FRYDENBERG (HJ): As the Resources and Energy Minister of Australia, I am incredibly proud of the immense success of our LNG sector and the country’s effort to meet global energy needs, as well as of the importance of Australian workers in successfully developing our nation’s LNG capacity. By 2020, we will be supplying around 40 percent of Japan’s gas needs, 40 percent of China’s, and 25 percent of Korea’s.

In 1989 Australia enjoyed our first export of LNG from the North West Shelf. Who would have thought that by 2020 we would possess 10 separate projects and would overtake Qatar as the world’s largest LNG exporter? In fact, we’re the only country in the world to be simultaneously producing LNG from conventional wells, unconventional wells and of course even floating LNG when the

“BY 2020, WE WILL BE SUPPLYING AROUND

40 %
OF JAPAN’S GAS NEEDS

40 %
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25 %
OF KOREA’S GAS NEEDS”
"[...] the only fossil fuel that will increase as a proportion of the overall energy mix between now and 2040 is gas"

HON. JOSH FRYDENBERG  Minister for Resources, Energy and Northern Australia
EBR: The LNG sector already plays a major function in Australia’s economy. How do you foresee this contribution evolving over the upcoming decades?

HJF: I am optimistic about our LNG future over the coming decades because of three key reasons. Firstly, what I call the mega-demographic trends, particularly the increased global population. Between 2010 and 2030 there is expected to be a 23 per cent increase in the global population, while the world’s middle class will double in size. Additionally, we’re seeing hundreds of millions of people move from the regions to the cities as part of growing urbanization. This is leading to increased demand for gas, and according to the International Energy Agency, the only fossil fuel that will increase as a proportion of the overall energy mix between now and 2040 is gas. Whether it’s in Asia, whether it’s in Europe, whether it’s in the Americas, there is a consistent theme of an increased consumption of gas and that’s driven by demographic trends.

The second reason to be optimistic is because of the global drive for a cleaner, greener future. The carbon emissions from gas are less than those from other energy sources like coal and I think this plays to gas’ strength as an energy source. Importantly, major projects like Gorgon have emphasized responsible environmental initiatives like its carbon capture and storage facility, which is the largest such facility ever built anywhere in the world and will reduce the project’s carbon footprint by up to 40 per cent than what would otherwise be the case.

The third point I would make is that the LNG sector and Australia’s activities are incredibly technologically advanced and there are huge amounts of innovation and automation, and that drives productivity gains. So, for example, Woodside is using underwater autonomous vehicles at their Pluto facility and Santos is partnering with IBM in big data analytics to predict problems on their pipelines before they actually occur. Combined, with these changing demographics and competitive strengths, Australia is well placed to fully capitalize on the future growth in this sector.

EBR: What are the Commonwealth government’s concrete contributions to foster and expand this formidable LNG boom that is currently transforming Australia’s LNG profile?

HJF: The Australian LNG sector has seen USD 200 billion worth of investment in production capacity between 2003 and 2014. The test now is how we create the environment to attract the next wave of investment.
reforms including in deregulation, such as cutting red tape.

Here we have set up a one-stop-shop for environmental approvals in Commonwealth waters and that is saving the industry more than USD 120 million a year in reduced compliance costs. We have also been seeking to reduce the overall tax burden and to simplify our tax system, roll out key infrastructure and enter into new free trade agreements to gain access to new markets.

We’ve recently concluded and implemented free trade agreements with China, Japan and Korea, and obviously you have the 12-nation Trans-Pacific Partnership too.

**EBR:** Despite current volatility in international markets, why should Australia be optimistic about the future of its LNG industry?

**HJF:** With large gas reserves, significant experience in large-scale LNG development, a highly-skilled workforce and close proximity to Asian markets, Australia is well placed to face the present challenges and capitalize on the enormous opportunities that lie ahead in what is truly a golden age for gas.

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**Exploration wells and expenditure (real)**

![Graph showing exploration wells and expenditure](graph)

Source: APPEA Annual Report 2015
TOUGH LOVE ON HEALTH, SAFETY AND THE ENVIRONMENT

Preface: The CEO of the National Offshore Petroleum Safety and Environmental Management Authority, an independent statutory agency regulating the health and safety, structural integrity, and environmental management of all offshore petroleum operations in Commonwealth waters vaunts the virtues of Australia’s notoriously stringent regime.

EBR: Can you please start by describing the pivotal role that NOPSEMA plays in creating a safer and more environmentally responsible Australia?

STUART SMITH (SS): In Australia, areas beyond 3 nautical miles of the shoreline of a state or territory fall under Commonwealth (federal) jurisdiction, with the area immediately adjacent to the shoreline being within the jurisdiction of the relevant state or territory. The vast majority of Australia’s conventional oil and gas resources lie within the Commonwealth’s jurisdiction in offshore waters. NOPSEA’s predecessor, the National Offshore Petroleum Safety Authority (NOPS), was formed in 2005 to regulate occupational health and safety for offshore oil and gas operations within Commonwealth jurisdiction. NOPSEMA was established in 2012 when the organization’s scope was expanded to include regulation of well integrity and environmental management.
NOPSEMA is essentially an independent statutory authority administering an objective-based regulatory regime that places the onus on the operators to identify the best ways to manage the safety risks they create. NOPSEMA then evaluates the course of action proposed by an operator – in the form of a safety case or well operations management plan – and grants approval if the arrangements minimize the associated risks to a level that is as low as reasonably practicable (ALARP). This ALARP concept is central to the objective- (or performance-) based regulatory model under which NOPSEMA operates. The ALARP concept is also applied...
This cookie-cutter approach can lead companies to expend more time and energy than if a company had carefully and thoughtfully initiated the process with a blank slate.

STUART SMITH, NOPSEMA

by NOPSEMA to evaluation of environment plans that are found to be acceptable.

**EBR:** How do you ensure that NOPSEMA maintains the right level of capabilities to properly fulfill that mandate?

**SS:** NOPSEMA attracts and retains people with the high level of expertise required to understand the operations in detail, undertake assessments, and conduct compliance monitoring inspections. Consequently, a substantial portion of our staff comes from industry and the salaries and packages we offer are higher than you would normally expect in a government agency. The experience and expertise of NOPSEMA’s staff is essential to be able to challenge the companies we regulate to ensure that all reasonable steps are taken to manage risks appropriately, and to ask questions such as ‘are you doing enough?’

**EBR:** What have been the repercussions of a falling oil price and the commodity fade out on safety and environmental standards across the hydrocarbons industry?

**SS:** On the safety side, our priorities are centered on improving safety outcomes in the industry amid falling commodity prices. We’ve had industry on notice about this issue for over 12 months, making it a focus of our inspections. Companies have been telling us that they have avoided cutting safety positions when it comes to workforce reduction. While this may be the case, there is still a heightened risk when a company is trimming down its payroll, as employees are naturally distracted in the wake of reduced job security. With companies under pressure to implement cost-cutting arrangements we are also seeing more requests for the use of temporary measures as permanent ones. These requests can be reasonable, but they typically require further evaluation.

**EBR:** With respect to approval timelines, what would you consider to be the most common pitfalls that companies make when submitting new proposals?

**SS:** A common mistake involves a company taking an approved safety case or environment plan from another operation that has already been approved and attempting to just add additional information for a new project. This approach often leads to an overly complex document that includes an abundance of unnecessary information – imposing a large burden on both the company and NOPSEMA. On the safety side, complexity can lead to safety gaps or confusion, and in turn, increased risk of injury or accidents. On the environmental side, where approvals are often site-specific, one plan might be adequate in one environment but completely inappropriate for another. This cookie-cutter approach can lead companies to expend more time and energy than if a company had carefully and thoughtfully initiated the process with a blank slate, while incorporating any lessons learned from previous plans.

**EBR:** How is NOPSEMA then working with industry to streamline the process and mitigate wasted efforts?

**SS:** We’ve directed our efforts to educating companies when it comes to the approvals process. In the past, NOPSEMA was quite distant from industry and didn’t provide much guidance in terms of improving their respective plans. Now, we’ve taken a more interactive approach. We don’t specifically instruct them on what to...
put in the plan, but we will provide more detailed feedback to identify issues, development points and experience from across industry. Equally, we’re hosting more workshops with key industry stakeholders on an ongoing basis – especially in the wake of incidents.

**EBR:** How have oil and gas companies reacted to the more stringent health, safety and environmental regulations in force in Australia?

**SS:** Although apprehensive at first, the industry has come to acknowledge the sector-wide value in higher compliance standards for safety and environmental performance – especially in more specific areas such as oil spill response capability. Recent reviews confirm that there’s been substantial improvement in industry’s performance since NOPSEMA was created and in turn these improved outcomes have facilitated greater community confidence in offshore oil and gas. If the community has more confidence, there is greater acceptance of offshore oil and gas activity – which is particularly important in places that may become new provinces for exploration and production. There’s very keen interest from the community in some new areas released for offshore activity. In considering the development of these projects, it’s important that the community is confident in a regulatory process that holds companies properly to account and grants approvals when the environmental and safety measures are appropriate and sound. ☀️
As Australia grapples with profound economic, social and industrial change, “our intellectual infrastructure—universities—will increasingly be called on to play an even more important role in positioning the nation for long-term success,” observes Belinda Robinson, CEO of Universities Australia. “It is our universities that supply the graduates that will not only fill, but also create, the jobs of the future. Through their research programs, they deliver the ideas and breakthroughs that solve our most challenging problems and drive innovation,” she argues.

One of the hallmarks differentiating Australian oil and gas from other sectors is actually the strong relationship between universities, research centers, and industry. “They work very closely together, and that’s absolutely critical given the industry’s inherently cyclical nature so as to ensure that there are the right human capabilities for the tasks at hand... It’s vitally important that the research centers and the petroleum schools themselves are acutely attuned to industry dynamics and developments—working hand-in-glove to mutually reinforce shared objectives,” she reflects.

“We’re always going through these industry cycles from exploration to abandonment... currently in Australia we’re in the production wave, and following will be abandonment so we need to look forward and train accordingly—making sure that our students don’t think that there’s no future,” concurs Professor Klaus Regenauer-Lieb, Head of School of Petroleum Engineering at the University of New South Wales. “In four years time, the current first year students could be exposed to a completely different macroeconomic landscape,” he warns.

For John Dell, Dean of the Faculty of Engineering, Computing, and Mathematics at University of Western Australia, more needs to be done to pass this message onto the student cohorts themselves.
“Understanding that we are now moving towards a more mature stage in the investment cycle is an integral thing to highlight for students,” he says. “Rather than construction engineers, or project engineers, the sector is becoming much more interested in what it can squeeze from the assets. This includes asset management engineers, as well as operation engineers, which are now increasing rapidly in importance throughout the industry.” For him the onus is on the industry and academia to work together in guiding new generations of students about the best studies to pursue.

“Typically, there is a lag response between industry developments and labor market demand. For example, now we have some truly stellar graduates from petroleum schools that cannot secure a job, whereas five years ago the industry couldn’t get enough of them. So, the ability to continually and adequately deliver on labor market demands remains a salient challenge for our nation’s petroleum schools,” concludes Robinson.
CLEAR SKIES AHEAD FOR HYDROCARBONS IN AUSTRALIA’S “SUNSHINE STATE”?

Preface: Queensland is fast emerging as a new frontier for oil and gas, with USD 65 billion worth of extraction projects already under construction in the region. The sunniest place in Australia is spearheading an unprecedented gas boom, shifting towards becoming a major hub for various service providers and energy project developers. The influx of tourists flocking to the state might soon be rivalled by the increasing number of investors tapping into the booming gas market landscape.

At the crux of this paradigm shift lies three underlying distinctive elements that makes Queensland a favorable landscape – proximity, proliferation and profitability.

PROXIMITY
The Port of Brisbane is the closest major Australian capital city to Asia. This strategic location places it at a formidable advantage as an increasingly strong Southeast Asian energy-based economy is starting to emerge. Untapped oil and gas bounty in countries such as Indonesia, Vietnam, Malaysia, Brunei, and the Philippines are forecasted to bring future dominance in the field; thus creating a well-positioned momentum of opportunity for Brisbane-based companies to cater to the growing needs of the Asia Pacific region.

PROLIFERATION
The prospective plans to build the North East Integrator (NEI) is an instrumental proliferator to making Queensland-based products commercially viable and accessible. Interests in building infrastructure to facilitate transport for shale and coal seam gas across the north east region is peaking amongst juniors who are deeply invested in the opportunities that are surfacing. Access to unexplored areas remains the priority given the spatial dispersion of the reserves, thus necessitating associated technologies and infrastructure to build a foundation for the market. A multifaceted collaboration amongst members of government, associations, and the business community is imperative in order to create a stronger commercial traction for the products.
PROFITABILITY

Coal seam gas (CSG) is at the heart of Australia’s gas sector boom. With 92 percent of CSG resources localized in Queensland, the region holds a nexus of competencies that could elevate the economic potential of CSG to becoming a dominant source of natural gas production. The CSG production process presents paradoxical complexities in that while they are shallower and cheaper to drill, CSG wells have lower permeability rates and can only access smaller volumes of gas. Profitability margins are therefore typically thin in this market, yet the CSG production in Queensland is able to generate higher revenue due to heightened expertise, optimized operating costs and a highly-proficient mining culture which compliments its operations. However, the clouds remain in the horizon for the energy sector of Australia’s sunniest state. Exploration activities are at an all-time low due to factors such as the decline in global oil prices, lack of acreage prospects, capital constraints, data gaps and well as green tape environmental concerns. Exacerbated by the widespread shift from construction to operational phases that causes reduction in the labour force, the overarching energy crisis conveys an inexorably gloomy reality for the industry as a whole.

Nonetheless, many initiatives for CSG developments remain unhindered as Queensland’s competitive advantages outweigh current skepticism in the long-term vision. APPEA’s Director for Queensland remarks that “it is vital that Queensland has a vibrant and active exploration sector” in order to maintain is innovative and competitive disposition in the global milieu. He also asserts that the state’s energy sector is “an essential ingredient for future employment and business growth.”

The barometer for a definitive forecast on the energy sector remains undecipherable as the industry continues to be gripped with a plethora of uncertainties. What remains to be true is that Brisbane, and thus Queensland as a whole, with its insurmountable amount of resources and talent, will continue to propel innovation and push for brighter days ahead.
How did NOPTA initially come about? And what is the scope of its functions today?

GRAEME WATERS (GW):

The regulatory reforms that were first introduced on January 1, 2012, have their roots in a productivity review commissioned back in 2007. The purpose of the review was to look at the degree of regulatory burden facing the offshore oil and gas industry. At the time, the regime consisted of 7 separate regulatory bodies, which were known as the designated authorities, and were in essence the states and the Northern Territory. These bodies took care of all regulatory aspects regarding the offshore oil and gas industry, except for safety, which at the time was under the jurisdiction of the National Offshore Petroleum Safety Authority (NOPSA).

The productivity review recommended easing regulatory burden by creating a national regulator, originally envisaging a body called the National Offshore Petroleum Regulatory Authority (NOPRA). It saw this body as a single entity that would be responsible for all offshore oil and gas. It was clear, however, that the idea of having safety, environment, and the economic aspects of titles administration governed under one roof would create conflicts of focus. And so, the government’s response through the regulatory reform program was to expand NOPSA into the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), covering safety, environment, and well integrity, and create NOPTA to facilitate titles administration, and resource data management.

NOPSEMA is characterized as an independent statutory authority with a CEO that reports directly to the minister, whereas NOPTA is a part of the resources division, which sits inside the Department of Industry, Innovation and Science.

How would you describe your responsibilities as general manager?

GW:

The scope of my responsibilities as general manager deals with taking care of the day-to-day operations of the organization and implementing the decisions of the joint authorities (JA). Each state and the Northern Territory have a Joint Authority that comprises the Commonwealth Minister for Resources, Josh Frydenberg, and a state or Northern Territory Minister. As titles administrator, I am an advisor to the JA – equally advising both the commonwealth minister and the states and territory ministers. My responsibilities lie in the technical assessments of applications made by oil and gas companies and providing

Putting things in perspective, simply because we’re an island, Australia possesses the largest offshore area of any of the offshore oil and gas producing nations.

GRAEME WATERS

GENERAL MANAGER

OF THE NATIONAL OFFSHORE PETROLEUM TITLES ADMINISTRATOR (NOPTA)
my recommendations to the JA on whether or not a particular title should be granted to an applicant.

If we talk about the cycle of a title, from the acreage release, my involvement commences at the receipt of the bids for exploration permits. I then advise the joint authority on the assessment of those bids. The JA, however, does not necessarily have to follow my advice. My recommendation is based on a purely objective assessment of whether or not an application fits within the established guidelines, whereas ministers will take into account a whole range of other potentially competing priorities such as local and commonwealth issues, political landscapes, and broader strategic perspectives. Putting things in perspective, simply because we’re an island, Australia possesses the largest offshore area of any of the offshore oil and gas producing nations.

**EBR:** The exploration permit application focuses on several characteristics such as financial capacity, work programs, exploration strategy, and prior performance. From your experience, what are the most critical consideration factors for companies looking to secure an exploration permit?

**GW:** The underlying motivator here is for the offshore oil and gas industry to work in the interests of Australia’s growth and prosperity – the stewardship of our country’s offshore oil and gas resources. I’m primarily concerned that the bids meet a certain set of criteria such as whether or not the company is a bona fide explorer with sound financial capacities and its work program is sufficient enough to advance the geological understanding and ultimately production of a resource base.

It’s a competitive process that considers the relative merits of one application against another. Essentially a title gets granted to the company that will produce the most likely positive outcome for a resource base. Where it becomes difficult, of course, is that many applicants of similar size, experience, and financial capacity will propose similar work programs – painting a very fine line between the strongest contenders. Unlike many other jurisdictions around the world, the Australian government is granting rights over very large expanses of offshore resources for an extended period of time. So, the people do expect a return over these rights.

**EBR:** What steps have you been taking to ease the regulatory burden on E&P companies?

**GW:** The whole premise underlying the establishment of NOPTA was to relieve regulatory burden. That remains our commitment and is a key performance indicator in the regulatory performance framework. We must ensure that our regulatory processes align to how industry is operating. So, for the regulator to be able to effectively streamline regulations it must align its processes with what industry does by automating workflows and opening up portals by which industry can better communicate with governments. Essentially, it’s about giving companies the opportunity to engage in dialogue about how they can facilitate change for themselves and not just be on the end of it.

**EBR:** How can Australia best remain competitive in terms of seeking and encouraging investment in exploration on a global stage?

**GW:** You can talk about the oil and gas industry as having three domains. The first domain is all about acreage with good prospectivity, and that responsibility largely rests with government – getting the pipeline of acreage release right to stimulate investment. The second and broadest domain is about technology – the big leaps forward, as well as the small changes. Onshore versus floating LNG, for example, represents a quantum shift in technology.

At the other end of the spectrum, however, there are constant changes being made around the way seismic is interpreted and the software that exists around that. Small changes; the 1 percenters that happen every day. That’s where the industry is really dynamic. The last domain then is how companies are confronting falling prices and rising costs and, overall, tackling the massive costs that are required to bring a discovered field to production. This is where companies need to work better at “sharing their kit” – coordinating infrastructure, sharing assets and sequencing development.
WESTERN AUSTRALIA
Lisa Scaffidi, Lord Mayor of Perth, Australia

BUILDING THE OIL & GAS CAPITAL OF THE SOUTHERN HEMISPHERE

Preface: The Mayor of Australia’s uncontested oil and gas capital speaks out about forging a hydrocarbons hub and center of excellence strong enough to rival Houston, Aberdeen and Stavanger.

EBR: How does Perth, and more broadly speaking, Western Australia, fare in terms of economic and social performance compared to the rest of the country?

LISA SCAFFIDI (LS): In terms of population, the state of Western Australia makes up approximately 10 percent of the national population, and ranks as the largest state in the country. That said, much of the state remains uninhabitable due to the sheer harshness of the vast terrain, which results in most of the population remaining congregated within a select few regions. Despite this reality, the state contributes as much as 30 to 40 percent of the total national output, thus positioning it as a very important economic hub for the country at large.

Perth’s importance is reflected in the tremendous growth of the city, which has been able to flourishing in part thanks to the oil and gas sector, as witnessed by the influx of various global companies establishing their southern hemisphere headquarters in the city. The city has also constantly ranked very highly on The Economist magazine’s Livability Index, recently attaining a top ten position out of 200 major cities globally.

EBR: What exactly is the appeal of basing a company headquarters or research facility here in Perth?

LS: The primary appeal is proximity, time zone wise, to nearly 60 percent of the world’s population. We are also becoming much more networked into the South East Asian and Far East Asian spaces. Rather than merely looking eastward, as had been the traditional view of Western Australian actors in the past,
The state contributes as much as 30 to 40 percent of the total national output, thus positioning it as a very important economic hub for the country at large.

Lisa Scaffidi, Lord Mayor of Perth, Australia

WESTERN AUSTRALIA

Lisa Scaffidi, Lord Mayor of Perth, Australia

the perspective of the region now looks northbound, where there are potential markets up there accounting for billions of people.

EBR: How has the oil and gas sector helped shape Perth into the thriving city that it is today?

LS: With oil and gas serving as a predominant sector throughout the state, it has brought a lot of opportunity to the region, which has resulted in fresh employment and construction activity. The ability to host global conventions, much like the LNG 18 conference held in April 2016, showcased our strength as a southern hemisphere oil and gas hub.

EBR: Following the recent slumps of oil prices, has the region felt a reciprocal slowdown in activity?

LS: Recently, we have definitely felt the effects of a slowdown in employment, and we anticipate for future investment to decrease, as well as to encounter a curtailment of large projects in the region, such as Chevron’s Gorgon. These have been the identifiable negatives, but the positives have been that there are still enough commitments to other developments following an attempt of the government to help diversify the economy into other science related sectors.

These initiatives include a stronger focus on medical research, scientific innovation, including the international Square Kilometer Array project, which is a worldwide next generation radio telescope project being conducted here in Australia. We are also a sister-city to Houston, which hosts facilities associated with NASA, and in this capacity, Perth is excited to be developing itself as a unique scientific hub as well. We have been seeking to invite particular industry sectors back that may have been pushed out during the height of the oil and gas boom. Despite oil prices having entered into a down cycle, the city is still proving able to leverage its prominent service and knowledge capabilities.
JUNIOR AMBITIONS: PUNCHING ABOVE ITS WEIGHT

Preface: Matthew Allen sheds light on the ambitious growth strategy of one of 2016’s busiest Australian juniors and uncovers the secrets of its success.

EBR: What have been the key milestones to date in Otto’s history as a company?

MATTHEW ALLEN (MA): The core focus of the company for nearly ten years was in the Philippines, where we had a number of pieces of acreage in the region. Otto was notably involved in the Galoc oil field, and, as CFO, I led the US$54m acquisition of Vitol’s equity in this field in 2011.

Over the following two years, we worked at improving the operating performance of the FPSO, taking it from around 80 percent up-time to nearly 100 percent operating performance and up-time, and maintained this performance through to 2015. We also executed a subsea redevelopment project, drilling two new horizontal wells, and tied these wells back into the producing FPSO. This stood as a very successful project, and it was brought on stream in December 2013, increasing the production rate to over 12,000 barrels per day. Galoc has gone on to produce over 15 million barrels of crude oil and stands as one of the largest oil fields in the Philippines.

With the oil price weakness in 2014, and with the knowledge that the Philippine oil fields are geologically very challenging, in 2014 we undertook a transaction to divest our producing interests. This deal closed in February 2015. One of our final initiatives in the Philippines was the drilling of an ultra-deep water exploration well called Hawkeye-1 which we conducted in August of 2015, in an amplitude supported conventional play about 1,800 meters under water. This project actually came in both under-budget and ahead of schedule, providing us with a six million dollar profit! Unfortunately after the gas leg, we were hoping to strike oil, but we ran straight into water.

At the beginning of 2015, we stepped back and looked, with a global perspective, at where the industry was going and where Otto could best position itself for future growth. We found that the oil price shift had created a vacuum in the market, and an opportunity for companies that had capital. We had just sold our Galoc asset for USD 108 million, which put us in a very positive position where we boasted a substantial balance sheet while many of our peers were struggling with debt. Despite the market downturn, we were able to reward our shareholders, providing USD 65 million in a capital return.

EBR: Otto Energy has recently stepped into a joint venture with Byron Energy in Louisiana, USA. What is the philosophy behind investing in this region?

MA: In Louisiana, what we were looking for was a complimentary asset to our broader portfolio, one with a shorter cycle time to production, as well as strong cash flow generation that would allow us to spend organically in some of our other assets, such as those in Alaska, in the medium term. We structured a deal with Byron Energy, which was a multi-stage farm-in, enabling us to make a decision, drill a well, make further decisions and go forward with our plans. It meant that we did not put all of our capital on the table up front.

The Gulf of Mexico is definitely a region with a lot of activity, and there are pipelines all over: it only requires an access agreement with the nearest production facility, hook a well up, and begin flowing. If we are able to build a production base of approximately 5,000 barrels a day in the Gulf of Mexico, this will provide us with significant cash flow, which would allow for us to fund new ventures.
**EBR:** Tanzania is presently your only footprint outside of North America. What is the company’s strategy regarding its African assets?

**MA:** We will be drilling our first exploration well onshore in Tanzania in September 2016. In Tanzania, Otto has a 50% share in the Pangani and Kilosa-Kilombero production sharing agreements and the joint venture is preparing to undertake drilling of the Kito-1 exploration well in late Q3 2016. We will be participating in the drilling of this well, and it is hoped that we can replicate the sort of successes witnessed in recent years in both Uganda and Kenya.

**EBR:** What part of the company’s expertise makes you particularly confident in the company’s ability to drive value for its shareholders?

**MA:** I think the core of what we do well is to combine the technical aspects of geosciences along with commercial skills. Doing the right deal with the right assets are the important aspects for success and where there is a lot of potential for added value. With Galoc, for example, we knew what we could about the geology of the asset, and we operated there for nearly eight years, and then we were able to deduce that that was the appropriate time for us to exit.

As this happened in conjunction with the downturn of the oil price, both commercially and technically it was strategic for us to divest at that point of the cycle. We are hoping to replicate that approach in Louisiana.

**EBR:** What is your vision for Otto Energy in the upcoming years?

**MA:** We currently receive three to four new business offers a day, proving that it is presently quite an active market. While we are going through an industry cycle where some of our peers may be entering bankruptcy, or having their bank debts reassessed, we are very fortunate that we have several opportunities being presented to us. We have just drilled our second well offshore Louisiana, and we are prepared to drill two more through our partnership with Byron in the coming year. In addition, we will drill two to four wells in Alaska, and we will shortly be drilling our first well in Tanzania. We are pretty stretched at the moment. We are quite possibly the busiest junior company headquartered in Perth.

We are keen to focus, for the moment, on just a few specific play types. Currently the model in Louisiana is working very well for us. The assets that are currently available in North America would simply not have been available to a company such as ours only a mere 5 years ago. This has been part of the fortunate series of events that have led to us having the financial capacity, and the market being receptive to us investing at such a point in the cycle. The theme that we wish to maintain at Otto Energy is a stable cash-flow base that enables us to fund investments in higher impact and higher growth opportunities.

We think of this as a very balanced strategy, as we do not see ourselves as purely an explorer or purely a producer, and we wish to have a balance of exposure across the lifecycle of the business and continue to generate our own revenue capabilities.
Regarded as one of the world’s ultimate ‘gas bounties,’ Australia has long featured prominently in the minds of investors. Indeed, with eye-watering LNG mega-projects maturing the country into an energy superpower, a well-stocked pipeline of brown and green field options and dazzling array of unconventional prospects ripe for the picking, there is certainly much that appeals. “This is the only country in the world to have enjoyed 25 years uninterrupted growth and its progressive business climate makes for an absolutely fantastic place to invest,” affirms François Romanet, president of the French Australian Chamber of Commerce and Industry.

Nevertheless today the local industry finds itself in the midst of unprecedented upheaval. As the ‘golden age of construction’ draws to a close, and the country’s main energy protagonists hastily adapt to a de-alignment of demand and fluctuating oil price, it is clear that business-as-usual will no longer suffice. The paradigm is shifting and with it the rules of the game. “Only a few years ago, the mood was almost complacent. Now it’s the opposite,” reflects Niels Marquardt, CEO of AmCham as he contemplates an industry readying itself for change.
BULLISH ON LNG

With a worldwide push towards low-carbon economies underway, LNG has steadily crept into the global energy mix, acting as a prominent and cost-effective source for diversifying and securing energy supplies, particularly for gas-hungry nations across the Far East. According to the International Gas Union, natural gas now accounts for around 1/4 of global energy demand, of which 10 percent is supplied in the form of LNG. Meanwhile LNG supply has proliferated faster than any other source of gas—averaging 7 percent per annum growth since the turn of the millennium. Australia, for its part, having shrewdly invested USD 200 billion — a full 12 percent of the nation’s GDP—in a plethora of large-scale LNG projects, looks well set to reap a windfall from the anticipated uptick in demand.

With an expected capacity exceeding 85 mtpa after the completion of these projects, the rise in local natural gas production places the nation on a steadfast trajectory to overtake Qatar as the world’s largest LNG exporter by 2020—a truly impressive endeavor. “In fact, we’re the only country in the world to be producing LNG from conventional wells, unconventional wells and of course floating platforms when the Prelude facility is up and running,”

Source: Appea.

Australia’s Super-Size Gas Projects

1. Wheatstone
   - Start date: 2017
   - Production Capacity: 8.9 MTPA
   - Budget: USD 29 bn

2. Gorgon
   - Start date: 2016
   - Production Capacity: 15 MTPA
   - Budget: USD 54 bn

3. Pluto
   - Start date: 2012
   - Production Capacity: 4.3 MTPA
   - Budget: USD 15.3 bn

4. North West Shelf Venture
   - Start date: 1989
   - Production Capacity: 16.3 MTPA
   - Budget: USD 50 bn plus

5. Prelude
   - Start date: 2017
   - Production Capacity: 3.6 MTPA
   - Budget: USD 13 bn

6. Ichthys
   - Start date: 2017
   - Production Capacity: 8.4 MTPA
   - Budget: USD 34 bn

7. Darwin LNG
   - Start date: 2005
   - Production Capacity: 3.7 MTPA
   - Budget: USD 1.5 bn

8. Australia Pacific LNG
   - Start date: 2015
   - Production Capacity: 9 MTPA
   - Budget: USD 24.7 bn

9. Queensland Curtis LNG
   - Start date: 2014
   - Production Capacity: 8.5 MTPA
   - Budget: USD 23.7 bn

10. Gladstone LNG
    - Start date: 2015
    - Production Capacity: 7.8 MTPA
    - Budget: USD 21.6 bn

Source: Appea.
exclaims the recently appointed Minister of Energy and Resources the honorable Josh Frydenberg. “Australians should be proud of the sheer enormity of these projects. For example Gorgon, at USD 54 billion, constitutes the largest single private sector investment ever in Australia. It also enjoys a 99 percent Australian workforce, and you’re seeing this sort of phenomenon replicated around the country. Meanwhile Ichthys project in Darwin has deployed some 750,000 tons of steel to construct its gas pipeline, which is testament to the scale of what’s going on when you consider that the Eiffel Tower required only 7,500 tons,” he enthuses.

Both economically and politically, Australia appears smartly positioned to gain enormously from the export income that is accrued from LNG. “We will be tripling our production from now until 2020 and by then it is expected to be worth more than AUD 40 (USD 28.9) billion in annual export income. Meanwhile we are also providing critical energy supply to a demand-heavy region, which affords us ever-greater strategic strength.

By 2020, Australia will be supplying around 40 percent of Japan’s gas needs, 40 percent of China’s, and 25 percent of Korea’s,” he predicts.

However, with receding global gas prices, a contraction in demand from key Asian consumers, and increasing competition from US shale producers, there seems to be a never-ending myriad of factors conspiring to undermine the country’s grand ambitions. “Current expansion efforts to widen and deepen the Panama Canal will likely further boost American LNG exports to Asia, as larger ships will be able to harness this lower cost delivery path to their advantage,” analyzes Greg Vesey, CEO of LNG Limited (LNGL) and that’s not to forget the strong immediate competition already posed. “North America already constitutes an agile, business friendly environment highly responsive to shifts in market demand and strategically situated close to many major LNG off-take markets,” he warns.

Despite these manifold challenges, the Premier of Western Australia, the honorable Colin Barnett remains optimistic in his nation’s ability to capitalize upon the LNG fever. “We’re talking about a growth industry for the next 20 years bearing in mind Australia’s offering is robust for customers, producers, and investors alike: a significant undeveloped resource base, political stability, sound rule of law, an established business culture underpinned by integrity and trust, and close proximity to major Asian consumer markets,” he declares.
Though the inherent cyclicity of price may indeed prove troublesome to the most fragile actors, LNG actually offers genuine supply security.

COLIN BARNETT MLA, PREMIER OF WESTERN AUSTRALIA

While recognizing that commodity price fade out may slow down the penetration of gas in various markets, Barnett is nonetheless confident that the fundamentals for long-term gas demand will prove enduring, especially in large consuming turbo economies such as India and China. “The pride and political will, particularly in these emerging nations, will become increasingly important as environment-related, health-driven reforms edge into the global spotlight. Therefore, though the inherent cyclicity of price may indeed prove troublesome to the most fragile actors, LNG actually offers genuine supply security, especially in coastal countries, while serving as a pivotal medium in transitioning to a low-carbon economy,” he confidently assesses.

AFTER THE PARTY: WHAT NEXT FOR EPC?

Attracted in by Australia’s unprecedented pipeline of super-size LNG projects over the last decade and the country’s stable governance, most of the major multinational engineering, procurement and construction (EPC) players have long considered it worth their while to establish a strong footprint Down Under to fulfill the enormous construction needs that the Australian LNG revolution generated.

That’s not, of course to imply that the Australian market has not posed its own unique challenges requiring distinctive workaround solutions. “The primary hurdle has always been the comparatively high costs associated with Australia’s operating landscape,” recalls Peter Bennett, the recently appointed CEO of Perth-based Clough, while noting that the prevailing low oil and gas prices currently hampering the industry only serve to further exacerbate this impediment. When grappling with this sort of external environment, it thus “makes a lot of sense to orientate towards solution-based rather than process-based services which entails listening intently to the real needs of your customers, and being bold enough to consider fresh, novel, outside-the-box responses that may provide for more efficient and productive outcomes,” counsels Scott Cummins, CEO of Melbourne-based McConnell Dowell.

Some Australian LNG projects straddling ‘Class-A nature reserves’ have also presented an additional layer of technical and regulatory challenges for the engineering companies servicing these mega-projects. “Environmental considerations and requirements on Chevron’s Gorgon project were probably among the highest and most stringent ever implemented on any project of this type,” expounds Brian Kelly, regional leader Asia Pacific at SNC Lavalin. Nevertheless, most EPC actors agree that Australia still possesses the right foundations to remain attractive over the long run – with the slight twist being that now much of the major infrastructural apparatus has already been completed. “Will we ever see a reoccurrence of those fabulously heady investment levels witnessed over the past decade? I doubt it in the foreseeable future,” muses Bennett.

The pending completion of all major LNG construction projects indeed forces locally implanted EPC players to adapt their strategies to a ‘new normal,’ where fresh projects will continue to arise, but most certainly in a smaller and scarcer fashion than during the ‘big boom’ period of mega-constructions experienced over the last decade. The “gold-rush of yesteryear, has now past” as one commentator
bluntly puts it. Many of the main EPC players will now be looking to leverage through operations and maintenance (O&M) contracts the experience they accumulated during the assembly phase. “As the capital-intensive build side of things inevitably enters slow down, we’ll be focusing our efforts on redeploying our resources elsewhere...right now, we are witnessing a decisive shift in demand from construction, installation and commissioning to O&M projects so are naturally seeking to bolster our capabilities in areas such as assisting clients to mitigate and avoid shutdowns,” reasons Mitchell Buswell, Regional Manager of Brunel, which delivers specialist manpower to EPC operations.

“We’ve also been anticipating the end of the boom for some time,” agrees Eric Jas, managing director of engineering consultancy, Atteris. “The scope of our work has gradually shifted from primarily servicing mega greenfield projects, where we designed new-for-new infrastructure, to engineering support for existing infrastructure and also to smaller brownfield sites,” he recalls. “Businesses that came strictly for the boom shall either wind up, or exit the country, leaving behind the better, more competent, wiser professionals that can service the hydrocarbons sector more specifically by targeting asset integrity management and smaller tieback projects,” he calculates.
When it comes to fully capitalizing on Australia-bred expertise to benefit from new opportunities, many players are now squarely swiveling their gaze abroad. Following the money, even the local, homegrown EPC players are now ramping up their overseas footprints. “Our next growth markets will be found internationally… some aspects of our strategy will consist of organic growth and deploying resources from Australia to the US, while Africa represents another fast emerging strategic market where we forecast a lot of potential,” explains Clough’s Peter Bennett. “We firmly believe our successful [Australian] track-record will significantly increase the likelihood of being involved in other major LNG developments across the Asia-Pacific region, while this expertise can now also be appropriately mobilized across other geographies displaying similar challenges such as Canada or West-Africa,” attests Kelly.

As the golden age of big-ticket Australian infrastructure construction enters the twilight zone, giving rise to the new phase of O&M opportunities the modus operandi of EPC companies is also undergoing profound transformation. “One of the key components of this new era will be renewed attention to collaboration. We’re talking about the smooth operation of highly complex, multifaceted, big money projects. The industry simply cannot afford anymore to have the sorts of high-profile and immensely costly blowouts that we have sometimes witnessed the past,” analyses Cummings. More than ever, EPC players are being called upon to provide an increased level of certainty to their clients, which can only be attained through a genuine pooling of minds and resources. This new industry paradigm indeed implies that entities seeking to hoover up the next batch of contracts will have to show themselves adept at assuming a completely new array of responsibilities. “We are presently very focused on increasing our presence and our connectivity at the front-end of our business with all our customers… The sooner that we can apply the knowledge from our innovation, as well as fresh ingenuity from increased collaboration into a project development scenario, the greater the impact we can potentially make,” concludes Cummins.

Top 20 Oil and Gas Explorers listed on the ASX

<table>
<thead>
<tr>
<th>Company name</th>
<th>Most Recent Trade Price*</th>
<th>Market Capitalization**</th>
</tr>
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<tbody>
<tr>
<td>OSH Oil Search Ltd.</td>
<td>4.5</td>
<td>6846.8</td>
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<tr>
<td>BPT Beach Energy Ltd.</td>
<td>0.272</td>
<td>354.1</td>
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<tr>
<td>KAR Karoon Gas Australia Ltd.</td>
<td>1.15</td>
<td>283</td>
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<tr>
<td>FAR FAR Ltd.</td>
<td>0.049</td>
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<tr>
<td>AWE AWE Ltd.</td>
<td>0.311</td>
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<tr>
<td>DLS Drillsearch Energy Ltd.</td>
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<tr>
<td>SXY Senex Energy Ltd.</td>
<td>0.102</td>
<td>118</td>
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<tr>
<td>NZO New Zealand Oil &amp; Gas Ltd.</td>
<td>0.247</td>
<td>94.9</td>
</tr>
<tr>
<td>HZN Horizon Oil Ltd.</td>
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</tr>
<tr>
<td>STX Strike Energy Ltd.</td>
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<td>64.7</td>
</tr>
<tr>
<td>CVN Carnarvon Petroleum Ltd.</td>
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</tr>
<tr>
<td>BRU Buru Energy Ltd.</td>
<td>0.155</td>
<td>52.8</td>
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<tr>
<td>SEH Sino Gas &amp; Energy Holdings Ltd.</td>
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<td>46.8</td>
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<tr>
<td>LNR Lonestar Resources Ltd.</td>
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<tr>
<td>SEA Sundance Energy Australia Ltd.</td>
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<td>COE Cooper Energy Ltd.</td>
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<td>CTP Central Petroleum Ltd.</td>
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<td>AJQ Armour Energy Ltd.</td>
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<td>EGO Empire Oil &amp; Gas NL</td>
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<tr>
<td>JPR Jupiter Energy Ltd.</td>
<td>0.177</td>
<td>27.1</td>
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</table>

Overall Ranking on ASX

*($USD, Historical rate)
**($USDmm, Historical rate)

Source: Australian Stock Exchange (ASX)
LIFTING THE LID ON AN AUSTRALIAN EXPLORATION PIONEER

DAVE WALL — Managing director, 88 Energy

While the vitality of Australia’s exploration remains fruitful, many junior E&P have turned their sights on plays beyond the borders of the land down under. 88 Energy, together with JV partner Burgundy Xploration, has over the last year accumulated a substantial position in Alaska’s Central North Slope, grossing 272,422 acres, in pursuit of a liquids-rich exploration opportunity coined Project Icewine. The primary objective is an untested, unconventional liquids-rich shale play in a prolific source rock, the HRZ shale (Brookian Sequence), that co-sourced the largest oil field in North America; the giant Prudhoe Bay Oil Field Complex.

Since spudding the first well, Icewine #1, on October 22, 2015, the company has taken core which has demonstrated very favorable characteristics in early lab evaluation. “We’ve been on the lookout for three ‘Achilles’ heels:’ thermal maturity, permeability, and fracability,” reveals 88 Energy’s managing director David Wall. “The results from evaluation to date have confirmed that all three variables have been mitigated, and we are now planning for the next well (Icewine#2H), which will be a horizontal with a multi stage fracture stimulation. There’s still an ample amount of work to be done, but we’ve gone a long way in de-risking a play, which could host a huge recoverable resource.”

Geological data aside, the play is also further supported by several external factors. On top of relative proximity to existing infrastructure, generous exploration incentives are provided by the State of Alaska with up to 85% of exploration expenditure in 2015 cash refundable, dropping to 75% until mid 2016 and thereafter 35%. From this point forward, the company intends to initiate seismic acquisition to de-risk any localized faults in the area, while also finalizing funding / partnering for the of Icewine #2H.

BIG CONTINENT, JUNIOR AMBITIONS

All too often, junior oil and gas explorers are considered the minnows of the hydrocarbons ecosystem: small speculative and opportunistic start-ups and undercapitalized risk-takers aspiring to tap into big rewards. Australian juniors, however, have proven to be anything but small. Many have been paving the way with big ambitions, rolling out shrewd and successful business strategies despite times of great oil price uncertainty, and projecting a positive brand image based on a potent mix of audacity, technical prowess and agility. “The pedigree of Australian junior E&P ventures is simply second to none,” assesses one commentator.

Some of the most performing Australian small and mid cap explorers share a common thread as demonstrated by their notable ability to engage in expeditions in some of the most remote and inhospitable places on earth. Whether it is the nation’s well-ingrained heritage in mining or the unforgiving outback terrain that have given these feisty young players the gumption to tap into success not only domestically, but abroad as well, it is undeniable that many have progressed into a league of their own. “Australia constitutes a land of extremes of weather and distance… thus the characteristically Australian aptitude for solving stubborn problems is born out of hands-on experience,” reflects Todd Martin, general manager of the independent outfit, Ixom.

While the targeted regions of Australian junior players are diverse, in many ways their motives and attributes remain similar. Many Australian juniors seek to capitalize upon the opportunities of being listed on the Australian Stock Exchange (ASX) and leverage this to accrue stable shareholder support. When seeking sources of oil and gas to
expand shareholder value, regardless of where in the world exploration is taking place, the drivers ultimately remain the same. For Adrian Cook, Managing Director of Carnarvon, project selection is determined by the presence of a number of factors. “Essentially we gravitate towards places where there are adequate hydrocarbon volumes to attain our financial aspirations, effective governance, attractive fiscal regimes, a high deal frequency and tempo and the requisite oil and gas services ready in place to enable ultimate project realization,” he reveals.

The success of Australian juniors is not created in a vacuum, and many are discovering that there is strong interplay between the unique expertise and technology being developed throughout Australia, and contemporary market dynamics on which to capitalize. Carnarvon’s strategy, based on 3 main pillars, is not dissimilar to the strategies of many other home-grown juniors, including “early positioning into new untested resources, applying new technology to discovered resources, and improving cost structures to enhance project economics.”

When working outside of Australia, however, sometimes it is not just the remote and difficult environment that poses a challenge. As Matthew Allen, CEO of Otto Energy points out, navigating the business climate of a foreign site, such as working with American counterparts in the Gulf of Mexico, requires its own type of skills and strategy. Despite the Gulf of Mexico being “a highly interesting place to do business,” notes Allen, “a number of foreign entities have tried to do business there and have spectacularly failed.” As the US is a mature oil industry where landowners have the rights to title for their crude, business operations are very different to Australia where, as Allen believes, there is an increased “focus on engineering, geoscience and expertise.” “In the US,” he contrasts, “landmen are just as important as the technical skills used to operate a business. Finding a partner that has a good mix of both technical ability, and the ability to manage and grow a business is thus very important – and this is not something that can be done from Perth. It is vital to go out and meet partners on the ground, in places in the region, such as Houston, and create a business this way.”

Imparting wisdom for other juniors, Allen believes that “it is a trap for junior companies to become too attached to their assets, and become weighed down by them.” To refrain from being blindsided from other assets and...
opportunities that may be available, Allen prescribes cycling in and out of assets as an integral strategy by which all juniors should abide. One of the key elements of flexibility in this regard is that juniors in Australia can offer a highly liquid investment with pure play leverage. For Australian juniors, being listed on the ASX provides many positive opportunities to attract further investment. Even in bearish scenarios, 50 cents or 10 cents a barrel when multiplied by the resource potential is still several times many of these entities’ market capitalization.

Operating as a junior still poses many risks, with exploration more often than not equating to a trial and effort process. The skill and expertise of Australian juniors, however, in deploying state-of-the-art seismic scanning and surveying technology to lessen the risks of a gamble associated with exploratory drilling is in also notable. In some instances, accepting failure – or at least being able to judge when the potential for success is limited – and moving on to new opportunities is a key factor that allows for certain Australian independents to attain productive outcomes for their teams and respective shareholders.

As David Wall of 88 Energy proffers regarding the company’s strategy for their flagship Icewine #1 project based in Alaska, it was designed for one purpose, “and that was to tell us if we were going to fail, and if so, to fail as quickly as possible.

“As opposed to some of the larger companies that might undertake an

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extended multi-well drilling program before realizing feasibility, we juniors must adopt a more agile mentality in order to limit liabilities and sustain operations,” he continues. Whereas a “fail fast” philosophy may at first sound counterproductive, the ability to prepare for both successes and missteps allows for companies like his to work as efficiently, and cost-effectively as possible and even turn potential setbacks into advantages.

COUNTER-CYCLICALITY IN THE “NEW NORMAL”

“The oil industry has changed for good.” This, at least, is the perspective of many an analyst when contemplating an oil price stubbornly languishing below $50 USD per barrel. The price of oil has, of course, dropped many a time in the past, but current market dynamics and geopolitical tendencies suggest a full rebound will not be forthcoming any time soon. This harsh reality poses significant challenges for an Australian market addicted to what John Griffiths, CEO of Gas Energy Australia refers to as “gold plating of infrastructure investments” where “contractors are guaranteed a rate of return just for undertaking a particular project regardless of cost inputs.” Moreover it completely flips mega-project initiatives on their heads, built under the assumption of a stable $80 per barrel or higher market price. Despite this, many of Australia’s leading energy sector protagonists – whether the junior explorers, oilfield service providers or EPC outfits – have proven unexpectedly resilient, in rendering their market strategies ‘fit for forty’.

In some instances, E&P players are even choosing to take advantage of the current market dynamics as the basis for new prospects, as Carnarvon Adrian Cook notes, believing, “that current distressed market conditions offer the most advantageous window in which to accumulate quality opportunities. We definitely see it as a window of opportunity and have been building and diversifying our portfolio during this downturn.” Rather than being pessimistic, a more proactive approach has been implemented to “identify what could be undervalued, quality projects and try to capitalize on such opportunities.”

“When life gives you lemons…,” as the saying goes, the moral is always to make the most out of what opportunities you can. This has been very much the outlook of Matthew Allen of Otto Energy, whose team found that the “oil price shift had created a vacuum in the market, and an opportunity for companies that had capital.” Otto took the initiative to sell their Filipino Galoc asset for USD 108 million, “which put us in a very positive position where we boasted a substantial balance sheet while many of our peers were been struggling with debt.” This allowed for the company to refrain from any negative repercussions that come with difficult market conditions, and rather capitalize on endeavors with promising future potential.

One of the major repercussions of the low oil price environment has been the curtailment and shelving of many green field developments and corresponding refocusing on ongoing operations. Geeta Thakorlal, Senior Vice President Global Offshore of INTECSEA ANZ posits that, “operators all over the world are currently focused on developing their existing portfolios and, given the current pricing context, they indisputably need to assess development options with more...
force us to rule out most of the solutions we would have historically advised, and to look at new technologies and processes that would better fit with our clients’ evolving needs.” Part of this fact is that previously higher oil prices initiated a culture in the industry eager for constructing larger projects in much faster times, with operators, “looking for faster project delivery and wanting to get their return on investment much sooner.” This is not to say that projects will no longer be able to enjoy the benefits of expedited construction phases, but rather, new strategizing will need to be considered.

One technique under increased consideration is the use of predictive analytics. “Many companies are now able to take data from their respective databases and utilize new algorithms to build insights to optimize their plants operations,” notes Ken Fitzpatrick, chairman of National Energy Resources Australia (NERA). “We are also hearing of exemplary cases in process engineering, where data is synthesized and interpreted to prevent shutdowns and considerably enhance productivity and competitiveness,” he adds.

Another trend is to devote more energy to Enhanced Oil Recovery (EOR). “There are a lot of people walking away from assets leaving more in the ground than they actually took out,” proclaims Brad Lingo, managing director and CEO of EOR specialist, Elk Petroleum. In the current operating environment, assesses Lingo, “the companies that come to this revelation and understand what it takes to

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DAVID WALL, 88 ENERGY

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In state-of-the-art technologies and niche industry segments that further distinguish the city from other international oil and gas hubs and foster a mutual growth perspective geared towards projecting Australian LNG and FLNG prowess abroad.

Nor should West Australia’s role in real value creation be downplayed. “As befitting of a region where resources underpin the economy, we boast not only an incredibly sophisticated indigenous supply chain, but also huge wherewithal to innovate… to the point where we now possess the capacity to support first-in-kind projects for LNG, floating LNG, carbon capture and storage,” observes Malcolm Roberts, CEO of APPEA. Already numerous examples abound of locally derived and validated gas technologies and know-how being exported worldwide.

Excel using this type of oil production are the ones creating value… The notion that EOR is only profitable with high oil prices is a complete misnomer.” Considering that “the first budget to get cut by senior management is exploration, EOR is actually born out of low oil prices,” he concludes.

Even tangentially linked service providers have suddenly found themselves compelled to rethink their business models. “Our challenge in these straightened times is to retain relevance… increasingly our most formidable competitor is not another recruitment company, but rather a client’s internal talent pool and hiring process, which is a typical cost-saving measure. So it is vitally important to demonstrate that we make our clients’ lives significantly easier than if they had to do it themselves,” reasons Brunel’s Mitchell Buswell.

Australia has not experienced the challenges associated with a dip in oil prices alone, and the squeeze has been felt throughout many regions across the globe. The lessons to take away from the Australian model, however, has been the pragmatism to step back and review new strategies and opportunities that exist due to this new market dynamic, and remain both creative and adaptive to best achieve success and results. “If you’re hiding under a rock because the sky is falling, then you’re not going to be able to see the silver lining,” jokes 88 Energy’s David Wall.

PERTH: ENERGY HUB AT THE END OF THE WORLD

Rome wasn’t built in a day, neither was Houston. In little over a decade, however, Perth has successfully, albeit rather abruptly, transformed itself into a thriving melting pot of hydrocarbons expertise. Today West Australia’s capital city boasts over 85,000-industry professionals spread across some 700 odd petroleum-focused equipment, technology and services companies. Moreover, far from merely relying on the wealth of natural resources laden throughout the region’s prolific basins, the local government has been busily investing

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Common User Facility (CUF) is absolutely unique in its operating model and offers an unparalleled degree of affordable access to high capability infrastructure with companies only paying for usage as and when they require the facility. This model enables even less capitalized companies to hold their own within highly competitive international markets,” reveals Jonathan Smith, general manager of AMC Management.

While it already contributed more than USD 2.4 billion of projects since 2003 – many of which are unlikely to have materialized without this facility, AMC’s ecosystem is also stimulated by the large number of its clients having participated in the construction of two of the most complex Australian LNG projects: Chevron’s Gorgon and Wheatstone. Primarily focused on oil and

Greg Vesey, CEO of LNG Limited (LNGL), for instance recounts how he has managed to grow his company into a pioneering global player in LNG infrastructure investment delivering cutting-edge Optimized Single Mixed Refrigerant (OSMR®) liquefaction process technology to mid-scale LNG projects around the globe.

“We’re talking about a country that has built it’s innovation ‘off the sheep’s back,’ so to speak, meaning that innovation is truly initiated and inspired by direct market trends and affiliated needs,” expounds Todd Martin, general manager of Ixom. He explains how his “renowned Pure MEG hydrate inhibitor, was a completely in-house innovation, initially forged in response to Chevron’s hydrates challenges encountered on the Gorgon project before being scaled up and applied to Wheatstone project as well.”

“For anyone seeking to invest in oil and gas, Perth is the obvious place to be,” proclaims the honorable Bill Marmion, Western Australia Minister for Finance, Mines and Petroleum. “We’re busy cultivating a global investment, thought leadership and technology hub, delivering high-skilled job creation and bountiful growth opportunities within the context of a face-to-face business culture underpinned by integrity, cooperation and goodwill.”

The publicly owned ‘Australian Marine Complex and its Common-User Facility’s’ waterfront and heavy load-out capability fully embodies the Western-Australian avant-garde streak and willingness to embrace fresh thinking. With its attentiveness to enlightened collaboration, cost-efficiency and risk sharing, the complex has already attracted the active participation of iconic entities such as FMC Technology and OneSubsea. “Our
gas players, this unique facility now strives to bolster a valuable cross-sector interplay by coopting companies from other cutting-edge industries.

“Even if the final use may differ from one industry to another, quality standards are, for instance, similarly applied across the oil and gas subsea segment and the submarine and shipbuilding industries,” notes Smith. “We believe that, in the future, the most high performance companies will be adopting a broader business approach that entails finding solutions and closing strategic partnerships beyond the boundaries of their own narrow industry... our collaborative approach is already pioneering and supporting this increasing trend,” he affirms.

Indeed, according to Kym Bills, CEO of the Western Australian Energy Research Alliance (WA:ERA), one of the defining characteristics that marks Perth out from other oil and gas cities is its status as “a truly diversified resource capital where knowledge, learning and expertise from the worlds of minerals, mining and hydrocarbons can intersect and collide.” Complementary to the promotion of common use, shared infrastructure, Bills is keen to mainstream the practice of joined-up action when it comes to conducting research. “One of our overriding goals is to grow pre-competitive areas where research costs can be shared and expertise pooled,” he elaborates.

This collaborative approach takes on a crucial importance as Perth truly emerges as a laboratory for pioneering gas and marine technologies, such as Floating-LNG (FLNG), propelled by Shell’s flagship Prelude project in the region. “Together with the operator, we believe that we can build up Western Australia’s capacity to be the world class center in FLNG knowledge,” states John O’Hare, general manager of marine, defense, oil and gas at the Western Australia Department of Commerce. “We are mobilizing the West Australian educational structures to enable the up-scaling Australian oil and gas professionals so that they possess skills that are internationally transferrable so in turn Perth can encompass centers of knowledge where companies can go to solve not just Australian problems, but problems that may be faced in other fields and jurisdictions. Aberdeen and Stavanger have both proven to be excellent examples of this expertise export model, and this is very much a pathway we seek to emulate here,” he confides.
A COMMON SENSE REVOLUTION

Preface: The Chairman of an industry-led, government-funded initiative to inject competitiveness into the resource extraction industries of Australia outlines his ‘common sense’ action plan for improving collaboration, productivity and innovation.

**EBR:** What market demands in particular incited the formation of National Energy Resources Australia (NERA)?

**KEN FITZPATRICK (KF):** The Australian government recognized that Australia needed to reform its economy. Over the past 25 years, while Australia has been growing year on year, our competitiveness within the OECD has been slipping, particularly in business collaboration with universities and research institutions. Collaboration in general has been diminishing over the years. The Australian government identified 6 different sectors as significant contributors to the Australian economy, and as areas in which the country could make improvements in productivity and competitiveness: Oil, Gas and Energy Resources was one of those.

**EBR:** What are the key objectives of NERA?

**KF:** NERA includes the oil, gas, coal-seam gas, uranium, coal and related service industries, and our objective is to improve the competitiveness, productivity, and innovation in these industries. To do this, we want to improve 5 areas: industry-led research; industry led work-skills; grow the supply chain both domestically and globally; reduce the regulatory burden in Australia; and finally, improve collaboration within the sectors.

**EBR:** What outcomes does NERA hope to achieve by connecting industry players to promote collaboration and innovation?

**KF:** Connecting with operating companies, universities, training providers, suppliers and regulators is paramount to our mission so that we can bring everyone together to talk
Our competitiveness within the OECD has been slipping, particularly in business collaboration with universities

STUART SMITH, NOPSEMA

about pressing issues in the industry. Oftentimes a challenge is that not everyone is able to attend a symposium or a forum at one point in time, so our efforts are to network across the sector to connect the stakeholders to help promote collaboration and innovation.

We also hope to promote industry-led research. Australia has great research capabilities, and we hope to harness these capabilities to be used towards more applied research. By partnering with industry leaders and universities, we will be able to research pertinent information related to industry challenges.

EBR: What are some concrete measures being taken to address the issues you have raised?

KF: Firstly, regarding social license to operate, there is a real challenge in Australia to convince, and develop saliency in the hearts and minds of those in the community. For oil and gas, both onshore and offshore approvals are difficult to obtain. Across the board, there is an integral element of establishing community trust of resource extraction and processing. We see an increased need for social, environmental, and economic research into the consequence of these activities. Collaborations with the CSIRO, universities and other research organizations have been facilitated to build up this data, which is very important for the future of onshore developments throughout Australia and access to permits in the future.

Secondly, regarding work skills, we need to better understand the workforce for the future taking into consideration the increase of robotics, automation and remote operations. Finally, we also want to reduce regulatory burden on the sector. In Australia, there is a lot of flat time seeking regulatory approvals, and we want to but streamline the approval process but have the same level of regulatory diligence. There is a need to balance the regulators’ social license to regulate with the operators’ social license to operate. Communities expect the regulators to be strong, and at the same time they expect operators to implement with the industry best practices.
EBR: Having only taken over the helm in June 2015, how would you reflect on your time so far as the President of Australia West?

CHRIS WILSON (CW): It’s been an interesting time to arrive in Australia. There’s been a huge amount of investment across the sector, which will lead to Australia’s pre-eminent position as the leading producer of LNG. The high levels of activity have driven up cost levels and, coupled with diminishing commodity prices, created a relatively challenging operating environment.

That being said, however, I inherited a very well run operation. ConocoPhillips has been producing since 2004 in the Bayu-Undan field, shortly after which, the Darwin LNG plant came online. My primary mandate has been to keep the facilities running with the same level of efficiency and uptime.

The second mandate involves backfill for the Darwin LNG plant. The Bayu-Undan field offshore won’t produce forever. Around the beginning of the next decade, we see production coming to the end. So, my objective revolves around identifying and developing new opportunities to feed Darwin’s production lifespan, which has several decades to go.

With the USD 1.4 billion that ConocoPhillips has spent on exploration and appraisal activities in recent years, we now have two competing opportunities that fit the bill, in addition to other third party opportunities. My job is to progress and turn them into the next LNG project. This will be challenging because of the low prices we are currently experiencing and the relatively high cost base in Australia.

EBR: With an almost two decade-long history in the country now, what would you say is the strategic importance of Australia as an investment destination for ConocoPhillips?

CW: Australia has been a stable place to invest, which is one of the things we always look at. The government is very industry friendly. And of course, it’s got the resources to fuel LNG development – specifically assets with long-term production potential. Over the years we’ve developed a world-class Australian workforce that can compete with any other one of ConocoPhillips’s operations in the world. That’s a key asset that we’re really proud of and allows us to operate safely with high uptime.

EBR: Speaking about the company’s legacy assets, Conoco has served a pivotal role in accelerating Australia’s LNG boom – having become the 2nd operator of an LNG production facility in 2006. Within the subsidiary’s current portfolio of assets, what strategic value does Darwin LNG bring?

CW: In December 2015, we actually shipped our 500th cargo of LNG and the plant will be hitting its 10th anniversary of operation this week. It’s been a very successful investment for those involved. It was developed in a time of depressed prices, allowing the project to benefit from market deflation at the time. Due to the price increase in the subsequent years following 2006, Darwin LNG has been able to...
deliver USD 20 billion in tax revenue for Australia and Timor-Leste. Although it’s maturing, we still have a way to go and with backfill, we hope to keep it producing for many more decades. Furthermore, through Darwin, we’ve supplied LNG to key Asian consumers – particularly in Japan.

EBR: Has that same level of operational success extended to Bayu-Undan?
CW: Yes. Bayu-Undan is a gas-condensate field located in the Timor Sea within the Joint Petroleum Development Area (JPDA) and displays rather unusual characteristics on several levels. It had a high amount of liquids and a relatively unusual development process where we initially cycled gas to remove the liquids first before turning it into an LNG project. This has enabled us to maximize field recovery. As with any giant mega project, there’s always a challenge to deliver the project on schedule within budget – which I’m proud to say we did.

EBR: From your perspective, what are the implications for LNG producers as the industry shifts from a seller’s market to a buyer’s market?
CW: Prices will be key. The high pricing environment allowed many of these LNG projects to receive FID in the first place. We appear to be entering a period of lower and more volatile pricing for what might be an extended period, so everyone has to reduce costs. In Australia, the cost base, partly because of the construction boom, has been relatively high. So, that will be a key consideration for producers.

We are in a unique position compared to other operators in the industry. While most are just beginning to bring an LNG plant online, ConocoPhillips in the West has been running an existing facility for the last 10 years. The current high level of industry investment will be winding down in the next few years and we hope our backfill activity can provide some investment in the sector during this period. The backfill of Darwin will be a multi-billion dollar investment – probably only one of a few. Our liquefaction plant can operate for many additional decades and the economics of maintaining utilization rates are much more attractive than greenfield activity.

EBR: In a period where even “ultramajors” like Shell and Exxon are buckling down, your global CEO, Ryan Lance, has prioritized lower-cost production and short-cycle projects as keys to weathering the storm. To what degree, if at all, has this mindset shaped the direction of ConocoPhillips’ exploration activities in Australia?
CW: Globally our strategic focus is on shorter cycle projects to manage through a period of more volatile pricing. We also have historically invested in some longer cycle assets and our Australian operations fit into this category. Our strategy in Australia West has been consistent for a long time. We’ve been orientating our exploration activities around backfilling Darwin LNG and that remains our priority. So, nothing has changed with regards to Australia West, but there have definitely been strategic shifts elsewhere in the company in terms of direction.

Obviously to invest here in Australia, we need to complete globally with shale. Our main focus with regards to exploration revolves around the Barossa and Poseidon fields located off the northern coasts from Darwin and Broome respectively. Those are our two primary options. We’re working hard at reducing the sub-surface uncertainties and to drive cost down to a point where we can compete for capital globally and are ready to initiate the next phase of development. While shale may have changed the landscape dramatically, we still see upside potential in advancing our plays. Barossa and Poseidon both have advantages and disadvantages, so we don’t have a clear frontrunner. Barossa is a little closer and shallower, while Poseidon is larger but more complex. We’re trying to run them both in parallel to give us more options.
RIDING THE CONSTRUCTION BOOM

EBR: You were appointed Acting Managing Director and General Manager for the Oceania Region back in July 2015. What have you established as your strategic priorities since taking over the reins?

ANDREW TAN (AT): The focus of my attention has been INPEX’s Ichthys construction, as Chiyoda is part of the joint venture, alongside KBR and led by JGC, which was awarded the construction contract for the downstream LNG facility part of the project. As a partner of this joint venture, we are keen to ensure that our contribution on this project is conducted with the best quality standards possible, while ensuring that safety remains absolutely paramount until the termination of construction.

In this regard, Chiyoda has been able to build out of the success in the construction of the PNG LNG project in Papua New Guinea, where we displayed more than 80 million man-hours LTI free. Our objective for Ichthys is very much to replicate this remarkable safety achievement in Australia.

Secondly, we want to make sure the joint venture maintains the closest possible control on the construction operations in order to strictly respect our timelines and deliver the project on schedule. Finally, it is my ongoing goal to identify fresh business opportunities for the company in this region.

EBR: For the fiscal year 2014, Australian revenues amounted to US 1.26 billion, almost 30% of Chiyoda’s total returns. What do these impressive numbers say about the importance of Australia within the global strategy of the company?

AT: Australia is a pretty unique market where the numbers may be relatively inflated because of the higher operation costs that we face in the country, while similar projects in other parts of the world would represent only a fraction of the Australian cost. As an example, labor cost would usually represent around 20 percent of the total cost of a given project, while in Australia it can go up to 60 percent. At the end of the day, the revenues that we earn in Australia would actually be very similar to any other place in the world.
Nevertheless, the Australian region remains extremely important to Chiyoda and we recently strengthened our commitment in the region. We notably own a majority share in Xodus, an upstream engineering consultancy company, who maintains one of their main offices in Perth. We also recently formed a subsea joint venture with Singapore-based Ezra’s EPCIC service provider EMAS AMC called EMAS Chiyoda Subsea, which began operations on April, 1 2016.

Among the first activities on the agenda of this partnership, Ezra’s DP-3 ultra-deep-water multi-lay construction vessel Lewek Constellation will soon start some pipeline laying work for Woodside in Western Australia for the Wheatstone Project. Leveraging Xodus’s and EMAS’s expertise, we definitely identify growth opportunities in the subsea market in Australia. Chiyoda has historically and predominantly been an onshore LNG company, and thanks to these two new partnerships, we can now deepen our expertise in offshore and subsea projects. More than ever, Chiyoda stands as an integrated engineering company able to operate in an extremely wide range of projects.

**EBR:** Chiyoda is part of the JKC joint venture that has been supporting INPEX and TOTAL from pre-FEED and FEED to the construction phase. What sets the Ichthys LNG project apart in terms of engineering ingenuity?

**AT:** First of all, I would highlight that the Ichthys project is extremely important to INPEX, Chiyoda and for Japan as a country. From an innovation point of view, we notably implemented on this project a significant level of design modularity to facilitate the project construction. As you know, project construction in extremely remote Australian projects is an expensive exercise, which renders modular construction absolutely necessary. Although implementing modularization per se was not a world’s first, we implemented it on Ichthys at a scale that has absolutely never been done before.

We also displayed pioneering construction approaches for the LNG storage tanks, such as the concrete roofs – which now
Although implementing modularization per se was not a world’s first, we implemented it on Ichthys at a scale that has absolutely never been done before.

ANDREW TAN, CHIYODA, AUSTRALIA

EBR: Considering Chiyoda’s expertise and experience, the company is particularly well positioned to offer high quality services for any phase of an LNG project’s lifecycle. How do you want to position the company for the operation and maintenance opportunities that are currently blossoming in Australia?

AT: Historically, Chiyoda doesn’t stand as a company that would frenetically look at being involved in all kinds of different opportunities – we remain quite conservative when it comes to new business opportunities. We would of course envision to participate in other pieces of business operations as well as engineering maintenance in this part of the world, but we like to make very calculated moves, particularly in accordance with Chiyoda’s corporate philosophy. We definitely hold the expertise to pursue a wide range of operations, but we are also particularly conscious of what we want to do and the strategic direction we want to follow.

In Australia, there would probably be natural expansion and new business opportunities arising in the upcoming years, with regards to brownfield or upscale opportunities for instance. Nevertheless, once again, we will always remain extremely careful when choosing new development paths. We will never overstretch ourselves, and we want to ensure that we hold the right resources to make a success of any of our future contributions.

Looking at some of our key objectives for the upcoming years, we for instance want to further develop our subsea activities and jointly look at new business opportunities with EMAS Chiyoda Subsea and Xodus. Finally, being able to maintain our utmost safety standards on all our projects, and ensuring our staff can come home safely remains absolutely paramount to me and to Chiyoda.

stand at 47m high from the ground on top of two 165,000cum tanks- installed before the actual construction of the tank steel walls, in order to cope with the challenging weather conditions on the project site. These construction aspects stood as interesting engineering challenges for Chiyoda, and it clearly moved us forward up the learning curve in this capacity.

The Ichthys project construction is currently completed at more than 80 percent and we anticipate to have the first LNG produced during the early second quarter of 2017, while the project construction is slated to be fully completed by July 2017. To give an overview of the remaining milestones to achieve, all the building blocks of the project have already been completed, but we still have to build the ties between all these blocks.

EBR: Within the JKC joint venture, how would you define Chiyoda’s specific added value and expertise that the company brings to this project?

AT: Our deep and long-standing LNG experience is an aspect of key added value that we bring to the table and there are many areas where we could potentially make a strong contribution. After all, Chiyoda has been building LNG plants that currently produce more than 40 percent of worldwide liquefaction capacity!

In this vein, Chiyoda displays a particularly valuable track record of successful past projects, forged by contributing to the construction of LNG facilities of various scales all around the world. Despite some unique features that are specific to the Australian context, operating in this country displays some important similarities with past projects in which Chiyoda has been involved, providing us with the ability to extract and leverage the knowledge we gained in other geographies.

On the other hand, by being involved in Ichthys construction, we have also deepened our expertise in some key construction aspects, such as modular design, which could now be leveraged on other construction sites all over the world.

EMAS Chiyoda Subsea and Xodus. Finally, being able to maintain our utmost safety standards on all our projects, and ensuring our staff can come home safely remains absolutely paramount to me and to Chiyoda. ☮️
GUNNING FOR SHALE

Preface: Western Australia alone is estimated to hold the fifth largest reserves of shale gas in the world, yet the long expected ‘gold rush’ has yet to materialise. Opinions differ wildly on if and when the country can capitalize upon this latent resource.

Shale gas has become a booming business in the US, thanks to new generations of hydraulic fracturing technology enabling the commodity to be economically extracted from dense rock formations typically thousands of meters underground. The success of Texan producers, in particular, has inspired companies elsewhere to look at extracting the fuel and none more so than Australia, which happens to possess large shale-gas formations similar in size to the iconic Marcellus and Bakken American formations. One such outfit is Empire Energy Group, Australian headed up by CEO, Bruce McLeod. “I could see that a number of American juniors were starting to unlock the secret of the Marcellus Shale and felt there could be similar parallels in Australia, so back in 2009 contracted geologists with experience in new frontier petroleum exploration to commence a survey of shale basins in Australia... ultimately we determined that the McArthur Basin displayed the most attractive shale characteristics in Australia leading Empire, through its wholly owned subsidiary Imperial Oil & Gas, to claim approximately 75 percent of what is now known as the McArthur Basin Central Trough,” recounts McLeod.

Others are much more cautious. “It all seemed to happen very quickly in the US, but the science behind it actually wasn’t developed overnight... in Australia we still need to determine the optimum technology, and properly understand the nature of our own shale-gas resource and that learning phase could well take another 10 years,” warns James Baulderstone, head of unconventional gas at Santos. “Locally we encounter specific problems in effectively harnessing this resource,” concurs Professor Klaus Regenauer-Lieb, head of the School of Petroleum Engineering at the University of New South Wales, Australia. “This is attributed to the differences in stress that is applied to the rocks. In the US, they deal with extensional stress regimes. When performing hydraulic fracturing, the fracture will stay open, as these types of fractures have a natural tendency to open. As such, companies can be pretty successful with hydraulic stimulants in these scenarios. In Australia, those laterals simply don’t work, as fractures are oriented differently and have more of a tendency to close up because we’re dealing with compressive stress...
regimes. We thus have to experiment with alternative solutions,” he explains.

Nevertheless Regenauer-Lieb acknowledges that definite headway is being made. “From a technological standpoint, Australia has displayed excellence primarily in areas that crossover with the mining sector... What I think has been a really special development in Australia is the half billion-dollar investment in the deep geothermal well in the Cooper Basin. In this venture, we’re drilling down to 270°C. Rock processes are completely different from what we know on the surface. At those depths, fracking does not work so we’re innovating new solutions.”

Empire’s McCleod, however, believes that it’s only a matter of time before the economics for developing Australian shale gas becomes compelling. “The crucial fact in Australia is that the capital heavy infrastructure has already been built – no fewer than 5 LNG plants – and we’re now staring at a period of natural gas supply shortage. The 2 LNG plants in Darwin and 3 in Queensland, will require a significant and consistent supply of natural gas in order to deliver necessary stakeholder returns and already we’re hearing that the CononcoPhillips facility in Darwin is running short on reserves from the Bayu Undan gas field... onshore natural gas would appear the most obvious and logical solution,” he argues. “The only conceivable challenge might be the lack of pipeline infrastructure in Northern Territories,” he concedes, but the recent announcement of the go-ahead for a North East Gas Interconnector (NEGI) pipeline would seem to mitigate this last remaining complication. 🌟
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