

PROSPECT



FUTURE VISION

New partnerships push Western Australia forward





This edition of *Prospect* coincides with the start of a new era for Western Australia.

The Labor Government was elected in March on a platform of growth and regeneration of our State, with clear plans in place and a focus on jobs.

Western Australia was built on the strength of the State's resources sector, with the sector pushing the State forward to emerge, in recent years, on the world stage as a global resources leader.

Western Australia is a leader in mining and petroleum projects, is on the precipice to become a world leader in the liquefied natural gas arena, and our State is world-renowned for our resources expertise, including in the areas of regulation and safety, and in the development of new technologies.

The symbiotic relationship between our State and our resources cannot be underestimated and, as we have seen the development of new technologies and innovative methods in the resources industry, so too have we seen the growth of our State and where we are heading.

Our focus is on diversification and the evolution of our State as a dynamic leader in a wide range of industries, including science, technology, manufacturing, tourism, services, education services, agriculture and other industries.

Working together with industry, our State is evolving, pushed forward by our strengths and expertise to create new opportunities for growth.

Mark McGowan
PREMIER OF WESTERN AUSTRALIA & MINISTER FOR STATE DEVELOPMENT, JOBS AND TRADE

Bill Johnston
MINISTER FOR MINES AND PETROLEUM

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Prospect

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Cover photo: NASA's Robonaut arrived in Perth in June in partnership with Woodside (story page 14). Photo: NASA. Pictured opposite top right: Woodside head of cognitive science and robotics, Russell Potapinski; Robonaut; and NASA Robonaut Project Manager, Julia Badger. Photo: Woodside.

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Hon. Mark McGowan MLA, Premier of Western Australia; Minister for State Development, Jobs and Trade.

Premier numbers:

- 20: Mark McGowan has been a Member of Parliament for the past 20 years (elected December 1996).
- 30: Mr McGowan is Western Australia's 30th Premier.
- 40: The new State Government sat for the first time in May for Western Australia's 40th Parliament.
- 50: Born in 1967, this year marks more than one milestone for the State's new Premier.

PROFILE: MINISTER FOR STATE DEVELOPMENT, JOBS AND TRADE

March saw Western Australian Labor leader Mark McGowan officially sworn-in as the State's 30th Premier, following the 2017 State Election.

As well as Premier, Mr McGowan is the Minister for Public Sector Management; State Development, Jobs and Trade; and Federal-State Relations.

Mr McGowan was born, and grew up, in regional New South Wales and studied arts and law at the University of Queensland.

He was elected to the Western Australian Parliament as member for Rockingham in December 1996, having begun his career in public service as a lawyer in the Royal Australian Navy, serving as a Lieutenant at HMAS STIRLING in Western Australia.

Before standing for Parliament he served as Deputy Mayor of Rockingham.

In the years following his election to Parliament, Mr McGowan held senior portfolios in both Government and Opposition.

He was Parliamentary Secretary to former Premier Geoff Galop and served as a Minister in the portfolios of Education and Training; Environment; Racing and Gaming; Tourism and South West.

As Tourism Minister, he boosted Western Australia's tourism industry by negotiating to bring low-cost carrier Jetstar to Perth.

In recent years, he served as Manager of Opposition Business, as well as Shadow Minister for State Development, and Planning and Housing; and was elected Leader of

the Opposition in 2012, choosing to retain responsibility for the portfolios of Regional Development; Economic Reform; and Public Sector Management.

On his first day of Parliament as Premier, Mr McGowan congratulated all new Members of Parliament on both sides of the House while getting straight to business on several issues including Western Australia's iron ore revenue and the GST, and public service reform.

"The McGowan Government has a big legislative agenda," the Premier said.

"My team and I are looking forward to getting on with the job of fulfilling our commitments to Western Australians." ■



JOBS, TOURISM, SCIENCE AND INNOVATION NEW DEPARTMENT: CLEAR FOCUS

The Department of Jobs, Tourism, Science and Innovation (JTSI) was created on 1 July, to bring together the following functions: industry development, Western Australian tourism, science, international education, and innovation.

The new department will work closely with industry with a focus on growing jobs in Western Australia.

All of Western Australia's overseas offices, including Tokyo, Dubai, London, Mumbai, Jakarta, Kobe, Nairobi, Shanghai, Singapore and Seoul, as well as in-market promotion, will be consolidated and coordinated under the leadership of JTSI.

The changes are a result of statewide government reforms to create a more efficient public sector to deliver better services for the community.

Premier and Minister for State Development, Jobs and Trade, Mark McGowan, said the significant reform was aimed at creating collaborative departments focused on whole-of-Government objectives and delivering services in the most efficient way, including using new technology.

"Under our changes, departments will work together to solve the problems confronting our State, by communicating in an effective manner to deliver for the community," Mr McGowan said.

"This is the most significant reform of the public sector for a long time; we are not just changing the name on the door.

"I'm ushering in new leadership, new departmental mandates and new opportunities for the public sector to drive substantial long-term change and maximise each opportunity to deliver better services to the community."

The interim Director General of JTSI is Steve Wood, who was Director General of the former Department of State Development.

Mr Wood joined State Development as Director General in 2011, having previously worked in three Commonwealth and three State public sector agencies. He was also a Commissioner of the Western Australian Industrial Relations Commission for 10 years.

Under the State Government's public sector renewal, Western Australia's 41 departments will reduce in number to 25.

The former Department of Mines and Petroleum has merged with the Department of Commerce's regulatory functions and labour relations to become the Department of Mines, Industry Regulation and Safety (see story page 5).

A full list of the new agencies and more information on the renewal of the State's public sector is available at: www.publicsector.wa.gov.au ■



Mines and Petroleum Minister Bill Johnston is also Western Australia's first Minister for Asian Engagement.

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SHARING A BRIGHT RESOURCES FUTURE

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The new Minister in charge of Western Australia's mineral and energy sector is uniquely qualified to be enthusiastic about its future and the State's trade with Asia.

That's because Bill Johnston is not only Minister for Mines and Petroleum, he is also Western Australia's first Minister for Asian Engagement.

"I am upbeat about the resources sector in Western Australia because I think we have a tremendous set of skills to take advantage of our natural resources endowment," he said.

"Many parts of the world have attractive natural resources, but we have the right stuff when it comes to entrepreneurial spirit, a stable legislative and regulatory playing field, and the skills to exploit our resources for a cost that matches the world price.

"We have very few restrictions on foreign investment, we don't stop repatriation of capital, payment of dividends is unrestricted, and government in Australia does not intervene in mining projects. These are all reasons why Western Australia is a very good place to invest."

Mr Johnston is no stranger to the world of minerals and energy, having been the Shadow Minister for Mines and Petroleum for the past five years.

"I was able to build extensive networks in the industry during that time and now, as the new Minister, I am able to rely on the knowledge I've built up and be confident of getting clear guidance from a range of industry players."

Putting on his other government hat as the Minister for Asian Engagement, Mr Johnston said that the last 30 years of growth in the world's economy was driven by trade between emerging economies and developed economies.

"But when you look forward to the next 30 years, the driver of economic growth in the world will be trade between emerging economies," he said.

"Many of those economies are neighbours in our region in Asia and this is why Premier Mark McGowan is keen to make sure Western Australia is embedded in that growth so the State can benefit from every opportunity that presents itself."

Mr Johnston said that Western Australia's Asian trading partners would need natural resources and energy above all other commodities.

"We are well placed to do that, but a big challenge is to make sure the skills that we've developed as a mining jurisdiction are being marketed to our region."

Mr Johnston said that Western Australia had a lot to offer on top of its riches in natural resources.

"We also have extensive skills and technology to support the mining, and oil and gas sectors," he said.

"That is one of our big strengths and another is that we are an open economy.

"We are a stable investment environment. Investors can have 100 per cent foreign investment with none of the divestment requirements seen in other jurisdictions.

"Investors can also be confident that the investment environment is not going to be capriciously changed by the State Government.

"This is a mature resources province where the whole community is very familiar with the demands of resource companies. We have excellent infrastructure and companies can basically just come here and start doing business.

"Plus, unlike the Eastern States, our long term domestic gas reservation policy means that energy is available for projects." ■

THE CHALLENGES AND OPPORTUNITIES OF CHANGE

David Smith has more than three decades of experience in the State and Commonwealth public sectors, including agencies such as the Productivity Commission, Foreign Affairs and Trade, Prime Minister and Cabinet, Treasury, and Premier and Cabinet.

It is experience that will be critical as he leads the Department of Mines and Petroleum, as interim Director General, in its amalgamation with the Department of Commerce to create the Department of Mining, Industry Regulation and Safety.

The plans for widespread reform of the Western Australian public sector were announced by the new State Government in April and will create a significant reduction in the number of departments.

The Government has pledged to deliver a 40 per cent reduction in government departments – from 41 down to 25.

In making the announcement, Premier Mark McGowan said the Government was delivering on its election commitment to drive real change across the public sector.

“Under our changes, departments will work together to solve the problems confronting our State, by communicating in an effective manner to deliver for the community,”

Mr McGowan said.

“This is the most significant reform of the public sector for a long time. We are not just changing the name on the door.”

Mr Smith is one of the public sector leaders tasked with the job of turning the Government’s vision of reform into reality.

His previous experience holds him in good stead for the challenge of leading the new department.

“I have experience across a wide range of areas, which has given me the flexibility to adapt to the responsibilities of the role,” Mr Smith said.

“This includes an understanding of the role of both departments (Mines and Petroleum and Commerce), what the Government wants to do and would like to see from the amalgamation.”

Mr Smith liaised with both departments as part of his previous roles, particularly Mines and Petroleum.

“I had a fair amount of contact with Richard Sellers (former Director General) and Tim Griffin (Acting Director General),” he said.

“I felt like I knew the executive and understood what they were trying to achieve.”

Mr Smith is also under no illusions as to the role the resources industry plays in Western Australia. The four words he uses to describe the sector are “big, important, complex and misunderstood”.

“Mining and agriculture are often seen as old economy,” Mr Smith said.

“It’s not as bad as it used to be, but I think there is still a misconception about the resources sector.”

He points to the area of technology as a counter to the myopic view of mining as “old economy”.

“When you see what the resources industry does and has done in relation to technology and the use of technology – they have probably been leaders,” he said.

Mr Smith is equally measured in his assessment of the perceptions of boom and bust that permeate commentary about the sector.

“As we have moved from the investment phase into a more stable production phase there is, again, a misunderstanding that mining no longer plays the role it has played in the past,” he said.

“It is still there, it is still big business and it is still important to the State.

“It will go through stages of change and that will bring challenges for industry, for government and for the community.”

Mr Smith pointed to the inherent complexities of the department’s role in the industry as one of these challenges.

“There are so many different dimensions to the resources sector – from the geology, science and engineering, to production, environmental management and social impact,” he said.

“We have got to make sure we have processes in place that deal with all those different dimensions, and deal with them in the most efficient way we can.”



David Smith will lead the transition to the new Department of Mining, Industry Regulation and Safety.

As for the nuts and bolts of the amalgamation process, Mr Smith said staff would be placed “front and centre”.

“It is a people business, and we rely on our staff to do the job that we do,” he said.

“I am very conscious of the impact on individuals the amalgamation may have, but this is about opportunity.”

Mr Smith said the executive teams of both organisations were committed to achieving the Government’s vision through a phased approach.

“We have come up with a process and principles to guide the amalgamation and it is well in train,” Mr Smith said.

“We will look at things in the organisation that we can do differently together, do better together.

“It is a dynamic world in which we are operating. In our new organisation, as in the old, we will have a fair amount of our business activity devoted to where the world we are serving is going next.”

An important focus will be on safety.

“The Government has given us a good lead. They have put an emphasis on safety by including it in the new department’s name,” Mr Smith said.

“It is certainly an area that will see benefits in the amalgamation.

“There might be some things that are done in one area that can be picked up in another area. Not that we are expecting a radical restructure – it is about process improvement.”

While there will undoubtedly be challenges along the way, Mr Smith is confident of a bright future for the new department.

“This is a very exciting time, which I am sure will also present challenges, but I look forward to making the transition as easy as possible for our staff and our stakeholders,” he said. ■

ENGAGING WITH INDUSTRY

The first in a series of consortiums between the Western Australian Government and industry groups was held in May, with tourism the first cab off the rank.

The Industry Engagement Consortiums have been designed to promote key sectors in the State's economy.

Along with tourism, consortiums have been planned for defence industries, agribusiness, international education, manufacturing, aquaculture and creative industries, and mining, engineering technology and energy.

The consortiums will work to strengthen relationships between industry and government with stakeholders providing feedback, and outcomes resulting from the discussions feeding into future decision-making.

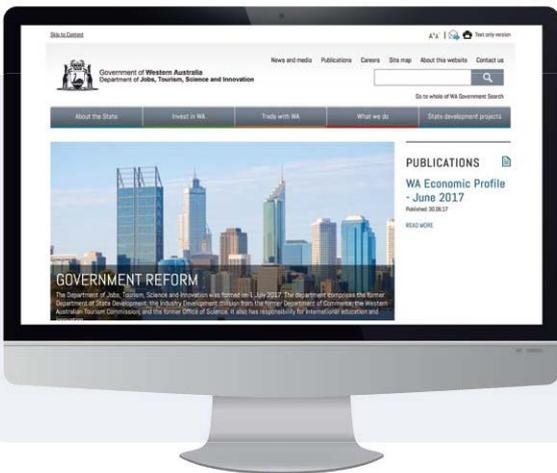
Most of the forums will be facilitated by former Rio Tinto Chief Executive Officer Sam Walsh.

Western Australian Premier and Minister for State Development, Jobs and Trade Mark McGowan said the Government was committed to forging strong relationships with industry through

consultation with key stakeholders and working together with industry to create jobs and grow the State's economy.

"The industry consortiums will focus on industries that drive economic development and create jobs for Western Australians," Mr McGowan said.

The Premier said it was fitting tourism was first cab off the rank, with the Government committing \$425 million to destination marketing and events over the next five years and elevating its importance in diversifying Western Australia's economy. ■



From 1 July, the former Departments of State Development and Commerce (industry promotion and innovation functions) and the Western Australian Tourism Commission (trading as Tourism WA) were amalgamated to form the new Department of Jobs, Tourism, Science and Innovation. For information on the new department visit: www.jtsi.wa.gov.au



Western Australian

Industry & Export Awards 2017



The Western Australian Industry and Export Awards are **now open**

For details go to www.exportaward.com.au/wa

There are 12 national export categories that lead to the National Awards and six state awards including the new Defence Exporter award.

Applications close August 7 | Winners announced at the Award Ceremony on October 26

WA's UNTAPPED RESOURCE POTENTIAL



CITIC Pacific Mining Management Pty Ltd CEO Chen Zeng, Dr Gaomai Trench, Dr Tim Griffin and CITIC Pacific Ltd Mining Chairman Jijing Zhang.

Western Australia's long and continuing success as a major supplier of metals around the world can actually be a problem.

That's a conundrum former Department of Mines and Petroleum (DMP) acting Director General Dr Tim Griffin posed when talking about his successful visit to Hong Kong for the 10th Mines and Money Asia conference in April.

"Companies mistakenly assume we must be exhausting our supplies and that there can't be too many new opportunities left in Western Australia," Dr Griffin said.

"In reality, it's the opposite and companies need to appreciate the sheer size and scale of Western Australia and the great potential that we have to offer, including the new speciality metals.

"The State is by no means getting close to running out of resources and the fact that the iron ore industry has been going so long, and is still growing, is a great example of that."

Dr Griffin said that countering any negative perceptions was part of the department's strategy for effective and long term engagement with Asia.

"Hong Kong remains a large financial centre and the conference serves as an ideal platform for the banking and investment

houses to hear what's happening in the resources world – in this case, the mining world specifically," he said.

"Because Western Australia is one of the biggest mining jurisdictions globally, we feel it's important that we are represented in Hong Kong so we receive interest from direct investors while we're there, as well as from the major financial institutions."

Dr Griffin said that one of the biggest positives for attending Mines and Money Asia was the opportunity to speak to the companies which had been investing in Western Australia for some time and to discuss in person any of their concerns.

During the three days in Hong Kong, Dr Griffin and Mineral Promotion Senior Manager Dr Gaomai Trench spoke to a range of companies and investors, including the senior management of CITIC, the company which runs the SINO Iron Project at Cape Preston, 100km southwest of Karratha in Western Australia's resource rich Pilbara region.

"Very often there may be expectations from a company that the State Government can do more to help them and our meeting with CITIC served as an opportunity to explain in a relaxed environment the limitations of the government's role in private sector investment projects," Dr Griffin said.

"The State of Western Australia also has very high safety standards, very high environmental standards and we have low sovereign risk, which is why we attract so much investment. However, because our processes and procedures are extremely thorough, they can take longer than companies expect, particularly if they fail to understand government requirements."

Dr Trench said the visit generated considerable interest and discussion in gold, lithium, cobalt and new energy metals.

"China is growing as a highly sophisticated, global manufacturing hub and will be consuming the commodities wanted by the rest of the world," Dr Trench said.

"Almost everything that is produced in Western Australia is important to China, whether it's the raw materials for steel or aluminium or the exciting metals like tantalum or lithium.

"It's so important for Western Australia to maintain its profile with Chinese manufacturers, especially those looking for metal supplies for their manufacturing business. By sharing what our State has to offer we give them the confidence we're still on our game and continuing to discover more." ■



L-R: Hon Takao Fujita; Premier Mark McGowan; Mr Masahiro Ogawa; Governor Toshizo Ido; and Hon Barry House.

HIGH FIVE FOR 35 YEARS: WA AND HYOGO

Western Australia and Japan's Hyogo Prefecture celebrated the 35th anniversary of their sister state relationship with a re-affirmation ceremony in April.

Hyogo Governor Toshizo Ido travelled to Perth for the ceremony and, together with Western Australian Premier and Minister for State Development, Jobs and Trade Mark McGowan, signed a fresh agreement re-affirming the two parties' ongoing commitment to the relationship.

Established in 1981, Western Australia's friendship with Hyogo is the State's oldest sister state relationship and has generated economic, cultural and social exchange activities.

These exchanges include students, teachers, government officials, artists, and sports people.

"Western Australia's friendship with the Hyogo Prefecture is built on mutual respect and understanding, and has been deepened through 35 years of social and economic exchanges," Mr McGowan said.

"On behalf of the people of Western Australia, I am honoured to re-affirm this commitment and look forward to taking this relationship into its fourth decade and beyond.

"The relationship was borne out of collaboration in the iron ore industry, but it now stretches into many aspects of the economy and community including tourism, trade, culture, education and sport."

Hyogo Prefecture is located in the Kansai region, the geographical centre of Japan. Its capital city, Kobe, was once the national capital of Japan in the 12th century.

The Western Australian Government has maintained a trade and investment office in Kobe since 1989.

Governor Ido was joined in Western Australia by a delegation of more than 60 people, including representatives from the political, environmental, aquaculture and tourism sectors.

During their visit, members of the delegation travelled to Albany and Margaret River, met representatives of the Western Australian Parliament, toured the Australian Marine Complex, took part in a tourism seminar, and visited Curtin University.

A number of events have already taken place to celebrate the 35th anniversary, including the Western Australian Youth Orchestra's successful tour of the Hyogo Prefecture in December 2016.

In 2016, Japan was Western Australia's second largest trading partner with total trade of \$17.5 billion, or 32 per cent of Australia's total trade with Japan. Western Australia's exports to Japan in 2016 were worth \$13.8 billion. ■

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PROJECT SEA DRAGON

MEGA PRAWN EXPORT PROJECT

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Seafarm's planned mega prawn project – Project Sea Dragon – will produce black tiger prawns for export markets in Asia. Photo: Seafarms

A mega prawn project planned near Kununurra in Western Australia is a step closer to reaching a final investment decision.

Australian company Seafarms' Project Sea Dragon received final environmental approval from the Federal Government in May to develop production ponds for the first stage of the prawn export project at Legune Station, located in northern Australia near the border of Western Australia and the Northern Territory.

Project Sea Dragon will be a large-scale fully integrated land-based prawn aquaculture project in northern Australia.

The project will be a staged development and the first stage includes three farms comprising a proposed 1120 hectares of production ponds, settlement ponds and services, at Legune Station, breeding facilities located near Darwin, and a processing plant in Kununurra.

A founder stock and quarantine centre, located in Exmouth in Western Australia is already operating and was commissioned last year with first prawns received last October.

Stage 1 is expected to produce 12,000-14,000 tonnes per annum of prawns.

The project has secured a site in Kununurra to allow for the development of the processing plant, which will process primarily frozen head-on shell-on prawns. The processing plant will be expanded along with project stages.

Seafarms' Dr Chris Mitchell said that currently there are only a limited number of fully integrated industrial-scale prawn aquaculture facilities globally.

"Seafarms seeks to tap into the growing demand for protein from a growing Asian middle class," Dr Mitchell said.

"A significant proportion of this new demand can only be met by seafood aquaculture, because wild catch is either at its sustainable limit, or in some cases outside Australia fisheries are over-stretched.

"Project Sea Dragon offers the opportunity to develop the world's largest Black Tiger Prawn industrial aquaculture facility, capturing the benefits of proximity to the world's largest end markets for a premium product."

With Commonwealth and Northern Territory Government environmental approvals in place, the last milestone prior to reaching a final investment decision on Stage 1 of the project involves developing an Indigenous Land Use Agreement with the traditional owners of Legune Station, and the company.

Seafarms estimates about 300-350 workers will be required for Stage 1 operations, ramping up to about 1500 at full production, across all sites.

A final investment decision on Stage 1 of the project is expected towards the end of 2017. ■



The capital of Kazakhstan, Astana.

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FUND DISCUSSIONS WITH OECD

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The international success of the Department of Mines, Industry Regulation and Safety's innovative Mining Rehabilitation Fund (MRF) and Abandoned Mines Program has attracted the interest of the Organisation for Economic Cooperation and Development (OECD).

The OECD invited the department to discuss the fund and program at a forum earlier this year in the resource-rich Republic of Kazakhstan.

The organisation invited the department's Abandoned Mines Project Manager Sarah Bellamy to take part in its Eurasia Competitiveness Program.

The two-day event was held in Kazakhstan's capital city Astana, with Ms Bellamy providing an in-depth presentation by video link, in addition to taking part in a working group meeting online.

Ms Bellamy said being invited to participate in the Kazakhstan program offered a great opportunity to work with the OECD and learn more about how it provided support to countries to enhance competitiveness and improve business opportunities.

She said Kazakhstan, like many other countries, relied primarily on bonds to secure funding to cover the costs of mine site rehabilitation but these were often not sufficient, resulting in burdens for rehabilitation works being placed on the Republic.

Kazakhstan declared independence from the Soviet Union in 1991 and has significant oil, natural gas and mineral resources. However, there is still a legacy of environmental degradation associated with mining in the Soviet era.

"It was exciting to be able to use the knowledge we have gained operating in Western Australia to help other countries develop their resources sector in a sustainable way," Ms Bellamy said.

"It really is a balancing act in terms of developing resources responsibly while also providing an economic benefit to the community.

"We are fortunate in WA to have a strong regulatory framework and rule of law ensuring we can develop our resources sustainably."

The MRF was introduced in WA in July 2013 after the State enacted the *Mining Rehabilitation Act 2012*.

The MRF created a pooled fund, contributed to by industry, to provide a source of funding in the event of an operator or tenement holder failing to meet all environmental obligations. The MRF now largely replaces the Unconditional Performance Bonds system.

"Although WA has a mature resources sector, the environmental bond system still did not cover all associated costs," Ms Bellamy said.

"There has been strong support from our mining and resources sector for the MRF, which is contributed to annually by WA's mining tenement holders.

"The MRF contributions are available to fund the rehabilitation of abandoned mines and interest generated from the fund can be used to rehabilitate historic abandoned sites through the Government's Abandoned Mines Program.

"There was very positive feedback to the WA Government presentation and



there was an overwhelming sense that they are keen to apply the MRF model in Kazakhstan.”

The MRF has received wide support from the mining resources sector in WA and does not remove the requirement for tenement holders to continue to meet environmental and rehabilitation conditions.

Ms Bellamy said the levy paid was determined by the category types and areas of ground and environmental disturbance present on each tenement, based on annual reports required to be submitted by tenement holders on or before 30 June.

“The fund has proven to be a more manageable and financially attractive obligation for both large and small companies than bond securities,” she said.

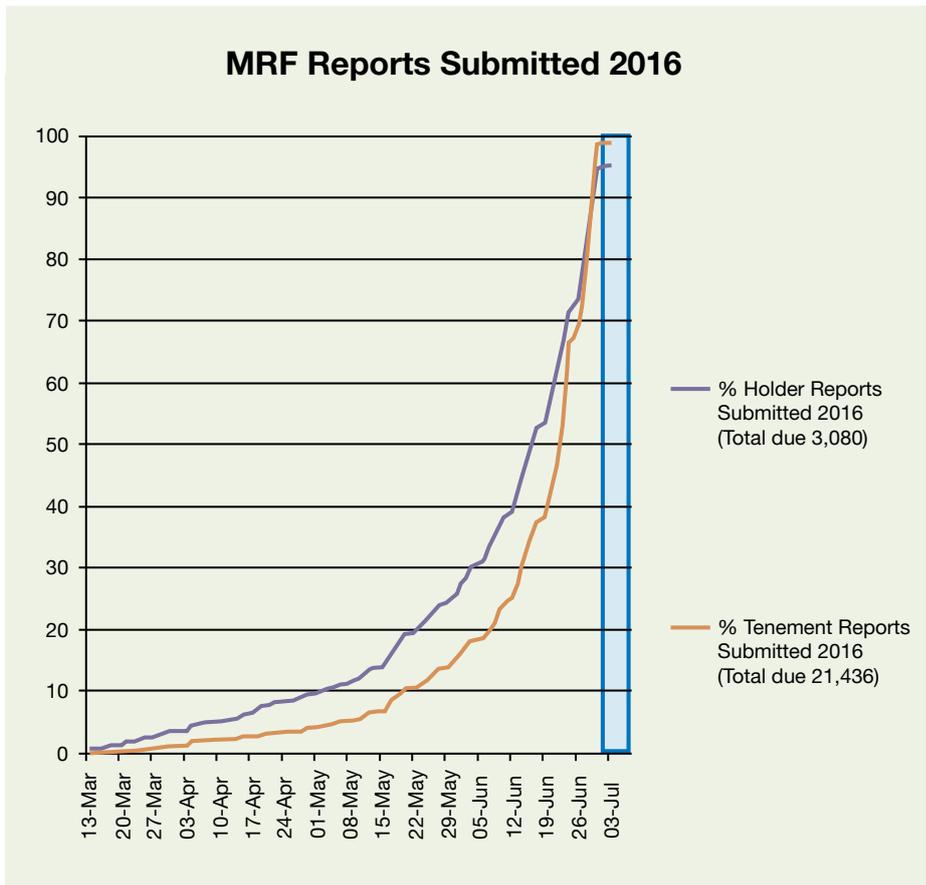
“The reports provided by tenement holders have also allowed us to create a large database of disturbance data which is invaluable.”

The Abandoned Mines Program, which was established last year, currently has four pilot projects.

The first two, Black Diamond and Pro Force are well under way and the second two pilots, Elverdton and Bulong, will begin consultation in the second half of 2017.

The department is developing a risk assessment and prioritisation methodology which will enable it to define program priorities for the future.

More information on the MRF and the Abandoned Mines Program can be found at www.dmp.wa.gov.au/Environment. ■



Annual MRF reports are required to be submitted online on or before 30 June each year.

CANNING BASIN FEATURES IN 2017 ACREAGE RELEASE

Western Australia's Canning Basin is at the forefront of the 2017 Acreage Release announced in May at the annual Australian Petroleum Production and Exploration Association (APPEA) Conference in Perth.

Department of Mines, Industry Regulation and Safety Executive Director Petroleum Division Jeff Haworth said that applications for bidding were invited for five onshore release areas in the Canning Basin, varying in size from 5324 to 6667 square kilometres.

"The release provides explorers with new opportunities to invest in the oil and gas sector and enables industry to undertake longer-term planning to support ongoing investment in, and development of, Western Australia's petroleum resources," he said.

Mr Haworth said that interest in the Canning Basin had increased in recent years with new oil play discoveries at Ungani in October 2011 and Ungani Far West 1 announced in March 2016.

"There have also been good oil and gas shows in the Ordovician Goldwyer Formation shale in the Theia 1 well drilled in July and August 2015," he said.

The northern three release areas L17-1 to L17-3 are contiguous, collectively covering 17,664 square kilometres, and are accessible from Broome by the Great Northern Highway.

"These are among the best explored regions of the Canning Basin where 15 wells have recorded hydrocarbon shows including Looma 1, Acacia 2, Mirbella 1 and 2 and Sally May 1," Mr Haworth said.

The southern two release areas, L17-4 and L17-5, are also contiguous and collectively cover 12,905 square kilometres. They are regarded as frontier acreage with much less on-ground exploration than the three northern release areas.

"They may contain salt-related traps in areas of the basin that lack major block faulting and are accessible by the Kidson Track, the Kiwirrkurra Road and the Canning Stock Route," Mr Haworth said.

The closest well is Gibb-Maitland 1, drilled during December 2012.

The nomination period for the 2017 acreage release will close at 4pm WST on 1 February 2018. Late nominations will not be considered.

Further information is available at the acreage release web page. Applications can only be made online, and it is recommended to register two days before bids close at www.dmp.wa.gov.au/pg

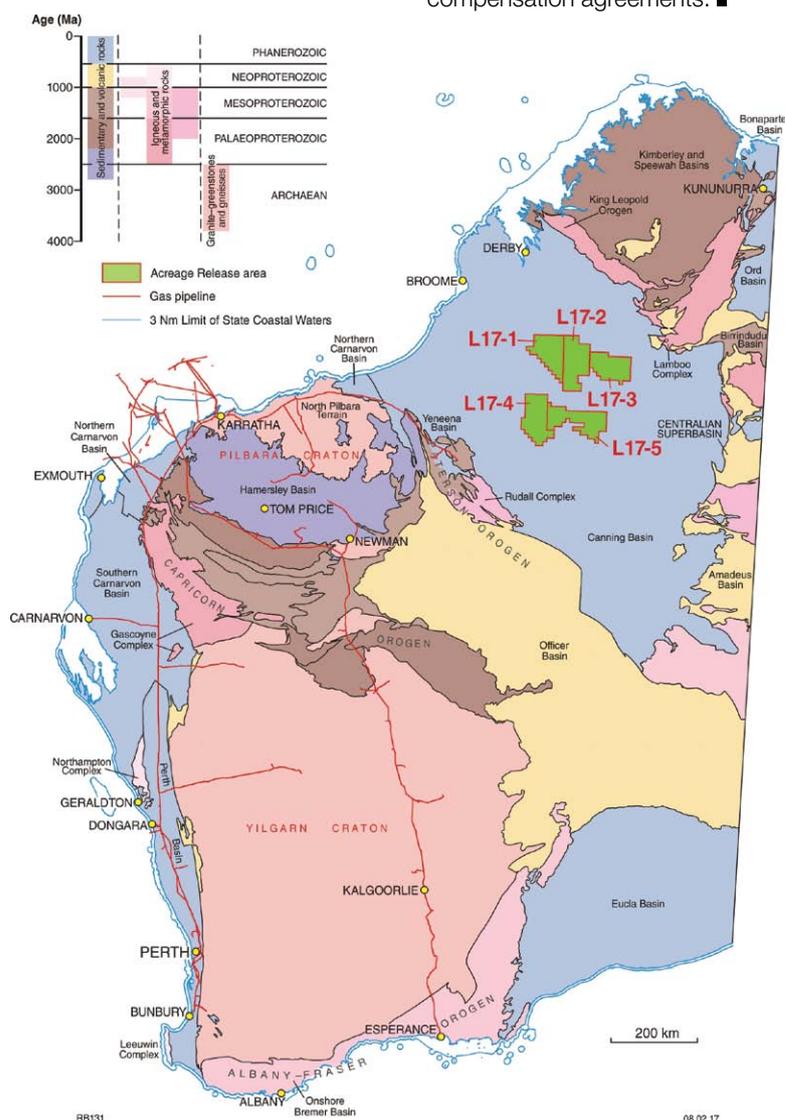
Once a successful bidder is announced, they must first gain Native Title agreement before an Exploration Permit (EP) can be granted. Until that occurs, no petroleum activity can occur.

Once an EP is granted by the department it is for six years and only gives the title holder the right to explore.

Petroleum activities which the title holder intends to carry out are rigorously assessed and approved by the department before work can begin and, where appropriate, multi-agency approvals will be sought by the department from other agencies, such as the Environmental Protection Authority.

Proposed activity next to sensitive areas such as national parks, towns or drinking water protection areas will be assessed under the State's multi-agency approvals process.

Petroleum companies are legally required to obtain consent from farmers and private land owners and occupiers before they can carry out activities on their land. This consent can include compensation agreements. ■



Map of the 2017 Western Australian petroleum acreage release.

WA ADOPTS STRATEGIC FIVE YEAR RELEASE FOR PETROLEUM EXPLORATION ACREAGE

The State Government has recently introduced a five year strategic approach for the future release of petroleum exploration areas across the Canning and Perth Basins in the State's northwest.

Minister for Mines and Petroleum Bill Johnston said the State Government supported the approach which aims to provide greater transparency to the oil and gas industry and to other stakeholders regarding proposed future acreage release areas.

Advertising blocks for competitive bidding is the department's preferred mechanism for industry to acquire an exploration title for petroleum in Western Australia.

Industry is also encouraged to nominate specific areas for acreage release, which will be considered within the year it is nominated.

"The department will implement the strategic approach with the release of a five-year Acreage Release Schedule of maps across the Canning and Perth Basins," Mr Johnston said.

"The maps highlight potential regions for future acreage release areas that will be opened for competitive bid rounds from 2018 to 2021.

"The acreage release schedule will be updated at least once a year after each acreage release round, and when significant amounts of new prospectivity data or acreage becomes available to warrant a review.

"Within a given region, discrete acreage release areas will be configured based on geological prospectivity, environmental factors, native title and cultural constraints, and land use considerations."

The maps advise stakeholders of:

- Upcoming areas likely to be released for competitive bidding
- Areas that are not currently available for SPA-AO applications owing to future planned release.

Canning Basin Proposed Acreage Release 5 Year Schedule Map
www.dmp.wa.gov.au/Documents/Petroleum/PD-SBD-GEO-120D.pdf

Perth Basin Proposed Acreage Release 5 Year Schedule Map
www.dmp.wa.gov.au/Documents/Petroleum/PD-SBD-GEO-121D.pdf

Obtaining Petroleum Exploration Titles in Western Australia Explanatory Note
[www.dmp.wa.gov.au/Documents/Petroleum/PD-PTLA-POL-109D%20\(WEB\).pdf](http://www.dmp.wa.gov.au/Documents/Petroleum/PD-PTLA-POL-109D%20(WEB).pdf) ■

New guidelines for assessment of petroleum exploration permits

The Department of Mines, Industry Regulation and Safety has introduced changes to its guidelines for the assessment of petroleum exploration permits.

The revised guidelines include changes involving drilling reservations and transfers to become a registered holder of a petroleum title in Western Australia.

The new guidelines apply to the acreage release announced in May 2017 published with the acreage release documentation.

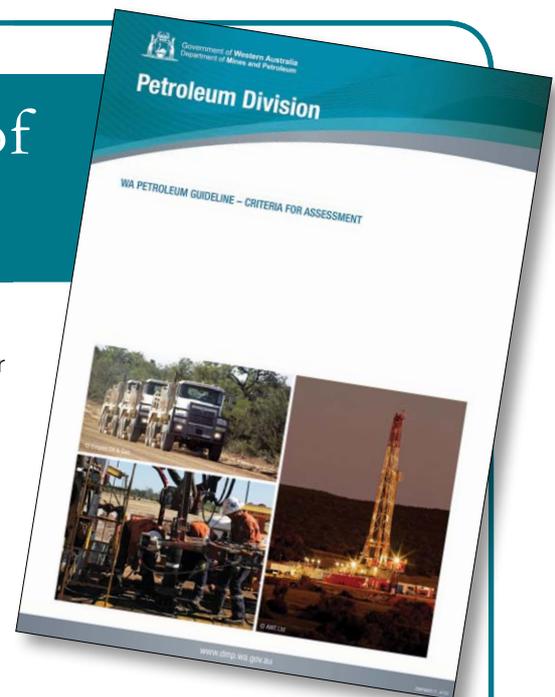
The new *Western Australian Petroleum Guideline – Criteria for Assessment* includes guidance on awarding petroleum exploration permits sought under section 31, and drilling reservations under section 43B of the *Petroleum and Geothermal Energy Resources Act 1967 (PGERA67)* through exercising an acreage option granted with a special prospecting authority.

The revision also covers transferring applications to become a registered holder of a petroleum title in Western Australia, under section 72 of the *PGERA67* and section 78 of the *Petroleum (Submerged Lands) Act 1982*, and the methodology the Minister will employ to determine the most deserving applicant.

The new guideline revision is not the result of legislative amendments or changes to policy interpretation, but is designed to give greater clarity to petroleum applicants and provide transparency to ensure consistent outcomes.

The guidelines outline the assessment criteria and processes to help companies prepare a competitive bid that meets the minimum requirements and ranking process used by the department.

The new guidelines are available at www.dmp.wa.gov.au/Documents/Petroleum/PD-PTLA-AR-106D.pdf



WA Petroleum Guideline – Criteria for Assessment.



Woodside Senior Vice President and Chief Technology Officer Shaun Gregory (right) meets Robonaut, with US Consul General Rachel Cooke (centre, left). Photo: Woodside

WOODSIDE WELCOMES NASA ROBONAUT TO WESTERN AUSTRALIA

Perth-based petroleum giant Woodside Energy recently announced a new collaboration with NASA to develop applications for NASA's Robonaut in the company's operations.

Under the partnership, NASA has loaned Woodside an Anthropomorphic Robonaut System for a 60-month deployment in Perth.

Built at NASA's Johnson Space Centre in Houston, Texas, Robonaut is a skilled human-sized robot developed to work alongside humans or go where risks are too great for people – including space, and potentially, high risk remote or inaccessible areas on Earth.

As part of the collaboration, Woodside will contribute its advanced cognitive science technology (or 'artificial intelligence') being developed in its Western Australian

operations, and NASA will share its expertise in Robonauts, which are already being used for simple, repetitive, or especially dangerous tasks in places such as the International Space Station.

The Robonaut arrived in Perth and was unveiled at a launch event at Woodside's head office in Perth on 16 June.

Woodside Senior Vice President and Chief Technology Officer Shaun Gregory said the unique partnership with NASA was a good fit with the company's collaborative approach to innovation.

"We want the best thinkers from inside and outside our company to be working on solutions that unlock value in our operations," Mr Gregory said.

"The partnership...also supports the Western Australian innovation agenda and will help our State realise its potential to be a global centre for scientific and technological excellence."

The deployment of Robonaut to Woodside's operations follows a series of technological innovations by the company, including growing its capability in 3D printing with the installation of the company's first 3D printed parts on operating facilities in 2016.

As part of the Robonaut project, Woodside will research ways in which the Robonaut could perform tasks from more than 300 ideas suggested by the company's operators, engineers and maintenance workers.

The ideas, put forward at a series of workshops held by the company, target jobs considered dangerous, dirty or dull, and include performing high risk tasks such as high voltage switching, first responder to alarms on unmanned platforms, or spoken work instructions to complement written manuals and procedures.

“We are looking for ways we can use robotics to reduce risk for our workforce and help us perform a wide range of tasks that complement activities carried out by our people,” Mr Gregory said.

“We believe innovation and collaboration can lead to solving some of our industry’s largest and most complex challenges and contribute to safe, efficient and reliable operations for our business.

“This new partnership with NASA is an exciting opportunity to accelerate Woodside’s cognitive science program which, together with our work in advanced data analytics, is helping us leverage the deep expertise of our people and pass knowledge from one generation to the next.” ■



Woodside's Goodwyn A gas platform, North West Shelf Project, Western Australia, received a 3D printed part in 2016. In collaboration with Monash University, the part was on its way to site within three days. Photo: Woodside Energy

REGIONAL REACH FOR INNOVATION

The Western Australian Government's 2017 WA Innovator of the Year program opened for applications in May, with the program including, for the first time in its 11-year history, a regional assistance package and professional assistance and mentoring for semi-finalists and finalists.

The program includes a Young Innovator of the Year Award with a prize pool of \$145,000 for winners to commercialise their innovations and get their ideas off the ground and moving forward.

The awards recognise exceptional local and regional innovators behind new products, technologies, processes and

services that benefit, or have the potential to benefit, the Western Australian community.

The program is sponsored by Mitsubishi Corporation, Woodside, South32, Business News, iPREPWA, EnterpriseFirst, Murfett Legal, Watermark and Wrays.

Last year's winners included the world's first fully automated 3D robotic bricklaying system by Australian technology company Fastbrick Robotics, and Perth company Subsea Engineering Associates' SEA-ICE innovation: a cloud-based intelligent computation, engineering and data platform for subsea systems to deliver detailed engineering insight for subsea systems faster, locally and at a lower cost.

Applications for this year's program closed in early June, with finalists, determined by independent panels, to be announced early August and an awards ceremony to be held in Perth in November.

For more information about the program, visit www.gcio.wa.gov.au/initiatives/wa-ioty/



GROWING WITH GAS

Perth hosted the 2017 Australian Petroleum Production & Exploration Association (APPEA) Conference & Exhibition in mid-May, reflecting the key role Western Australia plays in the global oil and gas industry.

Running for close to 60 years, the annual APPEA conference attracts thousands of delegates from around the world including company executives, senior personnel, key policy makers, government officials and people with an interest in the Australian oil and gas industry.

Vital to the Western Australian economy, the industry is a significant source of employment and innovation for the State.

Jobs and workforce diversity, as well as projects, and innovation and technology, were all hot topics at this year's three-day event.

Premier and Minister for State Development, Jobs and Trade, Mark McGowan, provided the keynote address on the opening morning of the conference.

"Oil and gas projects drive the State's economy, generating jobs in the industry and export earnings with flow on effects to the rest of the economy such as employment growth in construction, manufacturing, transport and services industries," Mr McGowan said.

"In 2016, the mining industry, of which oil and gas are major players, invested \$27 billion, accounting for 80 per cent of the State's total new private capital expenditure.

"In 2016, oil and gas industry exports totalled \$14 billion, accounting for 13.5 per cent of the State's total merchandise exports.

"If all Australian liquefied natural gas (LNG) projects are fully operational by 2018, Australia will have the world's largest LNG export capacity by 2018, surpassing Qatar.

"Western Australia's share of the nation's LNG export capacity in 2018 will be about 57 per cent or close to 50 million tonnes."

Mr McGowan said that foreign investment in the oil and gas industry was bringing into Western Australia new technology and skills, generating further innovation and productivity that the State Government would work with industry to encourage.

The Premier said the State Government had been supporting the oil and gas industry since the State's first gas discovery in the 1960s and would continue to support this important industry for Western Australia with a suite of initiatives, including:

- Overhauling the Industry Capability Network to better enable resource projects to access local labour and businesses; and to provide businesses (such as local small and medium-sized enterprises) with knowledge and capacity to compete for Government contracts
- Establishing Infrastructure Western Australia, an independent advisory body, to develop a State Infrastructure Strategy for the next 20 years
- Engaging the resources sector to participate in the creation of Innovation Hubs. The Hubs can be geographic areas where businesses in the resource sector come together with universities, the community and other industries to exchange knowledge and expertise and create new industries and jobs

- Providing a stable and predictable regulatory environment.

The Premier said that it was not only important that jobs were created during the construction phase of projects but also after construction was completed.

"Projects need to continuously generate jobs throughout their life, such as mining equipment, technology and service related jobs," he said.

"The mining equipment, technology and services sector that supplies the mining industry is highly innovative, resulting in benefits to the industry that include lowering operational costs, extending the productive life of projects and improving safety.

"The services sector that supports oil and gas production in Western Australia has grown significantly over the past few decades, consisting of diverse overseas and local companies with large employment.

"The sector is likely to continue to grow with the large domestic oil and gas production (and) will continue to provide crucial services for the operational phase of the State's oil and gas projects.

"It will also play an important role in containing production costs and increasing efficiencies, required to further strengthen Western Australia's competitiveness". ■



Western Australian Premier Mark McGowan (centre, front row) with United States delegates, including US Acting Ambassador Jim Carouso (centre, right) and US Consul General Rachel Cooke (centre, left).

WA WELCOMES US DELEGATION

United States Acting Ambassador to Australia Jim Carouso recently led a high level business and investment mission to Western Australia.

The focus of the visit was business opportunities and areas for collaboration in the infrastructure, transport, defence and information communication technology sectors.

The then Department of State Development (DSD), in conjunction with the Perth-based US Consulate, organised briefings, site visits and meetings with State officials, industry associations and global leaders in data processing and analytics at Perth’s innovation hubs.

Western Australian Premier and Minister for State Development, Jobs and Trade, Mark McGowan, as well as Ministers Bill Johnston, Peter Tinley, Dave Kelly and Paul Papalia met with the delegates during their visit in Perth on 15-16 May.

Briefings from DSD as well as the Public Transport Authority, Main Roads, the Metropolitan Redevelopment Authority and Government Chief Information Officer were well received.

Site visits included the Pawsey Supercomputing Centre, the Cisco Internet of Everything Innovation Centre, the Western Australian Chamber of Commerce and Industry, the Centre for Entrepreneurial Research & Innovation, and Edith Cowan University Cybersecurity Research Institute.

In addition to the Acting Ambassador, participants included US Consul General, Rachel Cooke; the Chief Executive Officer of AmCham, Niels Marquardt; and senior executives from companies 3M, KBR, GE Oil and Gas, AECOM, Amazon Web Services, ANZ, Education Abroad Network, and IBM.

The US and Western Australia have a long standing relationship built on trade and investment.

In 2016, the US was Western Australia’s sixth largest trading partner, with bilateral trade worth \$4 billion (equating to 10 per cent of total Australia-US trade), and Western Australia’s exports to the US valued at \$1.2 billion. ■

The US and WA

- American energy-related companies have significant investments in Western Australia including Chevron, ExxonMobil, ConocoPhillips, Bechtel, Halliburton, GE Oil and Gas, FMC Technologies and Schlumberger.
- Examples of projects include: Chevron’s 16.67% interest in the North West Shelf Project, 47.3% interest and operator of the Gorgon LNG Project and a 64.14% interest and operator of Wheatstone LNG Project.
- US petroleum producers and service providers have recognised the potential and research capability of Western Australia, choosing to establish the following technology units in the State, including: Chevron Global Technology Centre; IBM Natural Resources Solutions Centre for Petroleum; and GE Oil & Gas service, maintenance and training facility.
- Perth is Australia’s only member of the World Energy Cities Partnership, linking Western Australia to 18 of the world’s leading energy cities, including Houston.
- The US is ranked as Western Australia’s fourth largest tourism source market. There were 79,200 visitors to WA from the US in 2016 with an estimated spend of \$154 million.



INPEX-operated Ichthys LNG Project's central processing facility (CPF) "Ichthys Explorer". Photo: INPEX

PERTH COMPANY SECURES LONG-TERM CONTRACT ON ICHTHYS LNG PROJECT

Perth-based engineering company Monadelphous has recently been awarded a long-term maintenance services contract for the INPEX-led Ichthys liquefied natural gas (LNG) Project.

The contract is for an initial six-year period with a further two-year extension option.

The contract is based in the Browse Basin, about 450 kilometres from Broome on Western Australia's northwest coast.

INPEX has engaged Monadelphous to deliver operational, campaign and shutdown maintenance services and brownfield projects implementation associated with the Ichthys central processing facility and floating production, storage and offloading facility.

The INPEX-led Ichthys LNG project, which has been planned with an operational life of at least 40 years, involves some of the

world's largest offshore facilities, including the Ichthys Explorer – the largest semi-submersible central processing facility (CPF).

The massive CPF weighs 120,000 tonnes and topsides measure 130 metres by 120 metres.

In late May, INPEX celebrated the arrival of the Ichthys Explorer reaching its final destination 220 kilometres off the north coast of Western Australia where it will be located for 40 years.

The Ichthys LNG project is expected to produce 8.9 million tonnes per annum of LNG and 1.6 Mtpa of liquefied petroleum gas (LPG), as well as 100,000 barrels of condensate per day at peak.

Monadelphous managing director Rob Velletri said the company was delighted to be awarded a contract on a world-class LNG project.

"The contract continues to strengthen our position as a major service provider of offshore maintenance services," Mr Velletri said.

"We look forward to strengthening our relationship with INPEX and working together to create sustainable economic and social development opportunities for local people, businesses and communities." ■



Professor Kingsley Dixon. Photo: Curtin University

GOLDEN GECKO WINNER HEADS UP \$6.7M SCIENCE CENTRE FOR MINESITE RESTORATION

Triple Golden Gecko Award winner Professor Kingsley Dixon is spearheading a \$6.7 million research centre at Curtin University working with mining companies to apply world-class science to the rehabilitation of retired mine sites.

The eminent botanist, who won the annual Department of Mines and Petroleum awards for work with industry partners that achieved environmental excellence within the mining sector, will coordinate research at the Australian Research Council Centre for Mine Site Restoration (CMSR).

Professor Dixon, who was named WA Scientist of the Year in August last year in recognition of his efforts in conservation science, restoration ecology and plant science, said it was vital that the mining industry was supported in applying high quality science to its efforts to restore the integrity of mine sites.

“Restoration sits at the heart of Australia’s ability to sustainably and responsibly exploit its mineral wealth,” he said.

“The CMSR aims to connect high-end science with on-ground practice in mining restoration, and to train the next generation of high level researchers to be industry ready.

“Researchers both at the post-graduate and doctoral level will work within industry, so industry will get to see them and understand the value of science, and the scientists will see how their research is valued and applied in the industry setting.

“They’ll be able to understand the needs of the mining sector and enhance the sector’s capacity to deliver improved financial, social and environmental outcomes.”

CMSR has so far employed 16 PhD students from around the world.

The centre is supported by major industry partners including Sinosteel Midwest Corporation, BHP Billiton, Hanson Construction Materials, Karara Mining, Cliffs Natural Resources, Mineral Resources, and the Society for Ecological Restoration Australasia.

“I’ve spent 30 years working across the broad mining industry – it’s been a really exciting journey and it’s meant that WA, more than any other place in the world, leads in innovation in environmental repair following mining,” Professor Dixon said.

“The mining industry in WA has embraced the need for knowledge-led improvement in environmental management, but there is still much more work to be done.

“The industry has taken it on the chin that they need to do a lot better, because they mine on ancient, biodiverse and often important ecological landscapes, and it’s a great credit to them that they have risen to the occasion to support this centre.”

The centre, based at Curtin and with satellite activities at The University of Western Australia, Kings Park and a number of mine sites, will focus on six key research areas: restoration genetics, seed technology and enablement, rare species management, restoration ecophysiology, restoration trajectory, and mining industry policy development. ■



CSIRO 4WD with the mobile methane sensing equipment.

Soil gas (methane) flux surveys were carried out at 40 sites around the Warro gasfield, which included sites near wells that were hydraulically stimulated, as well as some control sites at a distance from the field for comparison.

Two sets of surveys were conducted at the Warro field, neither of which detected any anomalous methane flux at the sites. Future surveys may include a larger area across the northern Perth Basin.

The study reviewed the hydrogeology of the area and found that there is a good interpretation of groundwater flow at a regional scale, as described in a recent bulletin on the northern Perth Basin groundwater by the Department of Water (DoW).

However, the CSIRO study found that there was insufficient data for establishing baseline conditions of groundwater quality on a regional scale.

The department is continuing to work with oil and gas companies to help them adopt the groundwater monitoring guidelines that were developed jointly by the department and DoW.

Recommendations from the study include improvements to the groundwater monitoring coverage in the Yarragadee and Leederville-Parmelia aquifers, and further studies on impacts of the different sources such as facilities, towns, lakes, petroleum wells and cattle on atmospheric methane concentrations.

To understand seasonal variations, the study also recommended modelling atmospheric methane on a landscape scale at selected locations to investigate the sources of ambient methane and long-term monitoring of soil gas flux rates. ■

CSIRO NORTHERN PERTH BASIN STUDY REINFORCES PETROLEUM REGULATORY REGIME

A Commonwealth Scientific and Industrial Research Organisation (CSIRO) study has provided assurance that petroleum exploration activities in Western Australia are consistent with regulatory requirements and industry best practice.

Department of Mines, Industry Regulation and Safety Executive Director Petroleum Division Jeff Haworth welcomed the findings of the CSIRO study into methods of establishing baseline environmental indicators for the development of onshore gas resources.

“This collaborative program was between the CSIRO, the department, The University of WA (UWA) and four onshore gas explorers, Latent Petroleum, AWE Limited, Origin Energy and Norwest Energy,” Mr Haworth said.

The program examined monitoring in three environmental domains: shallow sub-surface, surface and near-surface atmosphere in the region between Gingin and Dongara north of Perth, forming part of the northern Perth Basin geological area.

The studies, carried out during 2015 and 2016, included atmospheric methane measurements, soil gas (methane) flux around the Warro gasfield, and an assessment of groundwater levels and chemistry of the key aquifers.

The atmospheric methane surveys, which covered about 2300km, found that the majority of the methane data across the area were close to the mean value of 1.77 parts per million (ppm).

This is similar to the methane levels from the latest greenhouse gas data from one of the cleanest air sources in the world at Cape Grim in Tasmania (www.csiro.au/greenhouse-gases).

Higher concentrations of atmospheric methane up to 4.5 ppm were measured downwind of the Dongara Processing Facility.

According to the CSIRO, the measurements were taken early in the morning, before the wind had risen, and the source was not identified, possibly due to higher density methane settling overnight.

The methane concentrations returned to background levels when measurements were repeated in the afternoon.

“The department is aware that the facility has been mostly on temporary shut-in status after these measurements were taken and is planned to be put on care and maintenance this year,” Mr Haworth said.

Atmospheric methane measurements taken around well sites were consistent with the low background levels, while atmospheric methane concentrations recorded across the region were too low to carry out any isotopic analysis to investigate the sources of methane.



Soil methane flux measuring equipment used by the CSIRO.

CONSTRUCTION FORGES AHEAD AT GRUYERE GOLD PROJECT



Exploration drilling at the Yarmarna site.



Gold Road Managing Director and CEO Ian Murray.

Construction work is well under way at the Gruyere Gold Project in Western Australia's outback after the former Department of Mines and Petroleum (DMP) granted the necessary approvals in February this year.

Gold Road Resources is undertaking the project as a 50-50 joint venture with Gold Fields Ltd at the new open pit mine about 200km east of Laverton.

The deposit is the first major gold find in the relatively underexplored Yamarna Greenstone Belt, thanks largely to a Co-funded Drilling Program offer from the Exploration Incentive Scheme (EIS) for the project in 2015.

Department of Mines, Industry Regulation and Safety Environment Division Acting Executive Director Karen Caple said the Gruyere Gold Project was the largest new gold mine operation approved in Western Australia since 2013 and has a JORC Mineral Resource of 3.8 million ounces of gold.

She said the successful approvals process, which culminated in February with green lights for Gruyere's Project Management Plan, Mining Proposal and Mine Closure Plan, highlighted the department's coordinated and cooperative approach to encouraging growth in the resources sector – from exploration right through to commencement of works and beyond.

"The department's Lead Agency Framework offers a single point of entry to assist proponents and coordinate the approvals process across Government," she said.

The department's approvals were the final step before construction of the process plant and associated infrastructure, and development work could start on the Gruyere open pit mine.

The proposal was referred to the Environmental Protection Authority on 2 March 2016 and the Minister for Environment approved the project in November 2016.

Gold Road Managing Director and CEO Ian Murray said the department's approvals were a significant milestone for the Gruyere development pathway.

"Following final project approval back in February, the Gruyere JV team has been progressing critical contract negotiations and early site works in preparation for full-scale construction to begin," Mr Murray said.

"We have named our preferred contractors for the bulk earthworks, and engineering procurement and construction contracts, and we are in the final stages of completing mobilisation plans.

"Contracts have been awarded for long-lead items, such as the primary crusher, and SAG (Semi-Autogenous Grinding) and ball mills, to ensure minimal interruptions to the construction schedule for the processing plant once it begins.

"Installation of the 648-room Gruyere Village has been completed, with the first stage commissioned, while the Anne Beadell Borefield has also been completed to secure water supply for construction activities and the village." ■

EIS in action

The Exploration Incentive Scheme (EIS) is a State Government initiative that aims to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector.

The main aim is to stimulate private sector resource exploration, leading to new mineral and energy discoveries. Most EIS activities focus on underexplored greenfield regions.

The Gruyere Deposit is particularly important because it was the first major gold find in what industry and EIS research indicates is a promising new mineral province, the Yamarna Greenstone Belt.

The EIS encourages exploration by capturing and publicly releasing pre-competitive data, including important new gravity data.

This data supported Gold Road Resources in targeting its exploration and subsequent success in gaining an offer in the highly competitive EIS Co-funded Drilling Program.

The co-funding aided Gold Road Resources to undertake further drilling at the Gruyere Deep Stratigraphic Hole, which was completed to a final depth of 1701.6 metres. The drill hole helped to refine the geological model for the deposit and demonstrate its size potential.



Dr Marcus Cattani, Mines and Petroleum Minister Bill Johnston and Mines Safety Director Andrew Chaplyn at the launch of the Injury Alarm.

DATA HELPS DEVELOP INJURY PREVENTION TOOL

An injury prevention web tool has been developed in Western Australia using Department of Mines, Industry Regulation and Safety data.

The tool's genesis was a call from the International Labour Organization for countries around the world to optimise the collection and use of occupational safety and health (OSH) data.

Injury Alarm analyses safety data to identify the likelihood of incidents and injuries occurring in a workplace and was developed by Dr Marcus Cattani using crucial data provided by the department.

Dr Cattani, who has worked in the field of injury prevention for 25 years, teamed up with Edith Cowan University colleague Professor Russell Jones.

Professor of Clinical Education in the School of Medical and Health Sciences, Professor Jones said that he shared Dr Cattani's concerns at seeing "the same sorts of patients, with the same sorts of injuries, and the same sorts of tragic stories, time and time again."

Professor Jones said that the faster a patient received attention, and the higher the quality of the attention, the chances were greater for a full recovery or, at the least, avoiding death.

"There will be a lag time before Injury Alarm can hugely reduce the number of injuries," he said. "However we really see this as moving towards eliminating or at least reducing a lot of the workload within emergency management and a lot of the suffering that occurs as a consequence of injury.

"The data from the department is terrific from an emergency management perspective, because it is real data and we can analyse it to identify exactly what types of injuries occur, where they occur and what frequency."

Dr Cattani said he had been using the data to create risk profiles.

"If you imagine that a risk profile is made up of say 15 or 20 different variables that the department have given us, we can then have a look and see what is the most significant of those variables," he said.

A total of 115 organisations have registered to be involved. When organisations input data, an algorithm analyses this data and a customised report is produced.

The department's Mines Safety Director Andrew Chaplyn, who helped launch the Injury Alarm on 28 April this year, said he could see benefits for the regulator as well.

"There is an old adage, what you can measure is what you can control," Mr Chaplyn said. "It's important we are able to see emerging safety trends. This technology has the potential to help direct our regulatory effort to where it is needed most – to where the hazards are.

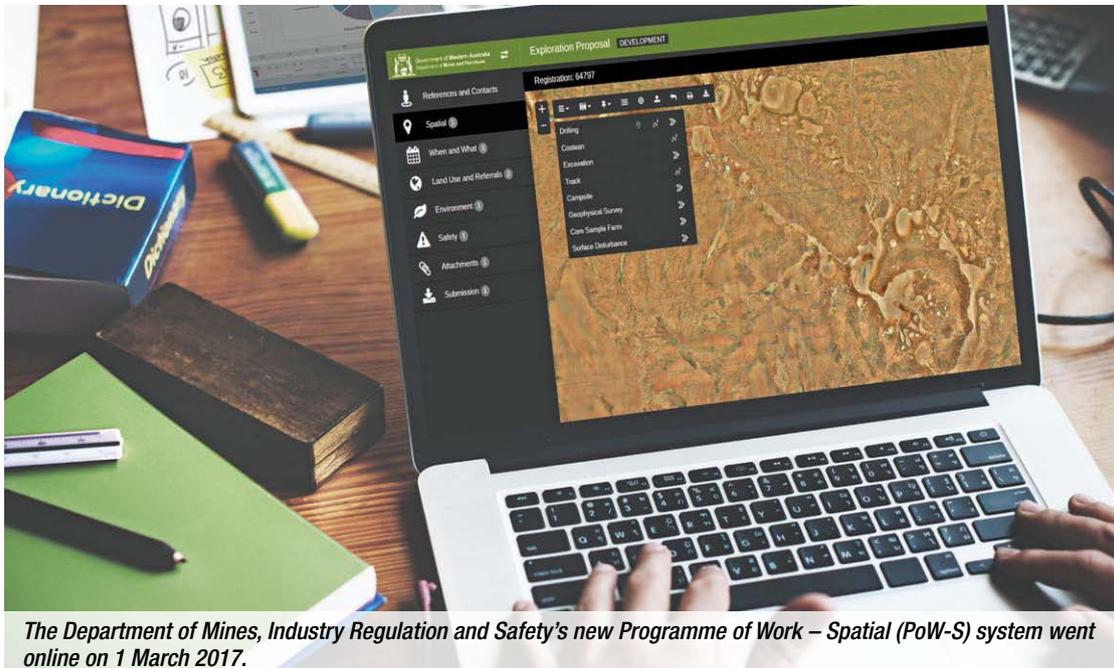
"Then we can work with those companies to make sure they have the right things in place to control those hazards."

While it is still early days for Injury Alarm, both Dr Cattani and Professor Jones are enthusiastic about its potential.

"We have come up with a good idea, we are testing it and we want to collaborate with people, because all of the signs are that we have come up with something that can make a difference," Dr Cattani said.

For more information about injury alarm go to: www.injuryalarm.com ■

POSITIVE RESPONSE TO NEW ONLINE LODGEMENT SYSTEM



The introduction of a new map-based online system has made lodging Programme of Work applications with the Department of Mines, Industry Regulation and Safety simpler and more efficient.

The new Programme of Work – Spatial (PoW-S) system which went online on 1 March 2017 offers real time feedback by providing all relevant tenement spatial information before lodgement.

Environment Division Acting Executive Director Karen Caple said the online system provided improved application quality, which would result in assessment efficiencies.

“The department received the highest number of exploration Programme of Work applications since 2012 for this March quarter, with 639 mineral exploration applications received, which is 50 per cent higher than the same time last year,” she said.

“Programme of Work applications must be approved before exploration can start and this new online system helps to make that lodgement process more efficient.

“Users are able to enter their proposed activities, either by uploading their existing spatial files or by digitising their

information onscreen using the map-based application.

“The system then automatically intersects the proposed activities with other data layers of environmental and cultural significance, which means any areas which require clarification can be addressed before the application is submitted.”

Ms Caple said the department had run several industry training sessions in Perth and Kalgoorlie to assist tenement holders to become familiar with the new spatial lodgement system before and after it went online.

A recent survey showed most users believed the system was easy to use, which was one of the major benefits identified when the department began investigating the possibility of moving to an external spatial lodgement system in 2014.

Environmental Officers were using the Environment Assessment Viewer spatial system at the time, and the new PoW-S system built on its success.

“Our initial analysis in 2014 found that potential efficiencies in the internal and external lodgement of PoW applications were likely to be more than 70 per cent by harnessing spatial technology,” Ms Caple said.

“Another benefit is that we can build on the process in the future.”

Updates had already been made to further improve functionality based on user feedback. These updates have included:

- Publishing of an upload format guide to provide guidance on shape file uploads, as well as some template shapefiles
- Improved system feedback when uploading shapefiles
- Improved quality of maps generated by the application
- Live feedback on distance and area while digitising activities
- New category for test pits activity.

PoW-S applications will eventually cater for all exploration or prospecting activities.

Initially, both the new spatial system and the existing PoW forms will be available but the PoW-E forms will be phased out during the 2017-18 financial year.

Prospecting (PoW-P) forms will continue to be accepted in hard copy and online via Submissions.

For more information visit:
www.dmp.wa.gov.au/Environment ■



TOWARDS 2020 VISION FOR HEALTH AND SAFETY

Towards 2020 is the Department of Mines, Industry Regulation and Safety's vision for health and safety in the resources industry.

Continuous improvement to safety in Western Australia's resources industry is driving the development of *Towards 2020* – a regulatory strategy for resources safety.

Officially launched by Mines and Petroleum Minister Bill Johnston at the Minesafe International 2017 conference, *Towards 2020* is the Department of Mines, Industry Regulation and Safety's vision for a safe and healthy resources industry.

Covering all legislation administered by the Resources Safety Division, it is the first of a series of high-level three-year rolling strategies.

Executive Director Simon Ridge said *Towards 2020* would guide the division's efforts to raise awareness and seek compliance in Western Australia's resources sector.

"It's important that we are measuring our performance and success to ensure resources are being applied appropriately," he said.

"*Towards 2020* sets outcomes to be achieved and how they can be measured.

"This enables us to become a more efficient organisation and better utilise our resources in working with industry to achieve improved safety outcomes."

Towards 2020 describes the regulator's goals, focus areas and measures of success for safety and health initiatives, and is presented as a live online resource that is easily accessible and can be updated as emerging issues and trends are identified.

Launching the strategy, the Minister said the safety and health of workers in the resources industry was a high priority for the State Government.

"*Towards 2020* will foster a shared safety and health vision, and how it can be achieved," Mr Johnston said.

"It will help Resources Safety effectively engage with all of its stakeholders, and share important information on health and safety."

Mr Ridge also highlighted the importance of effective stakeholder engagement.

"Working together produces better outcomes," Mr Ridge said.

"If we're not working together, then achieving those outcomes becomes a lot harder."

The development of the strategy was also driven by the pledge to make zero harm an aspirational goal.

"While we are unable to control everything in a workplace guaranteeing zero harm, we have had significant periods of time where we have not had any fatal accidents," Mr Ridge said.

This included an almost two-year period where no fatalities occurred on Western Australian mine sites.

"There is a whole suite of tools – technology, training, systems, processes, supervision – and all of these things come together," Mr Ridge said.

The factors that contribute to safety outcomes can be extremely broad. This means zero harm will be very hard to achieve, but it has to be our aspirational goal. We just have to get there one step at a time.”

Data will play an important role in achieving the department’s *Towards 2020* vision.

“Data can tell us a lot,” Mr Ridge said. “Part of the *Towards 2020* framework is about systematically analysing the data and finding what is hidden, which will assist us to improve safety.”

This includes the use of independent expertise to help make sense of the data the department collects. A recent example involved giving departmental data to local universities for research projects.

“Using tertiary institutions like Edith Cowan, The University of Western Australia and Curtin will help find previously hidden gems of knowledge,” Mr Ridge said.

“It is only through increasing our knowledge that we are able to make better decisions.”

Increasing the use of data to drive decision-making is an area in which Mines Safety Director Andrew Chaplyn shares a passion.

“It really is the backbone of what we are trying to do in mines safety,” Mr Chaplyn said.

“We collect so much information ... it is important we use that data to improve our understanding.”

Mr Chaplyn pointed to the evolution of the Safety Regulation System (SRS) as an example of how the department is doing this.

“SRS is able to turn information around very quickly,” he said.

“It can paint a clearer picture of what we are seeing and what the causes of these incidents might be.”

While data is important, both Mr Chaplyn and Mr Ridge agree that inspectors in the field are still critical.

“The analysis of data gives you a chance to develop accurate predictions,” Mr Ridge said.

“However, you need inspectors out there in the field, feeling the pulse on the ground.” ■

A safe and healthy resources sector



Towards 2020

Regulatory strategy for Resources Safety



The vision of a safe and healthy resources sector is supported by three key goals. Each is built on core elements that work together to achieve the Department of Mines, Industry Regulation and Safety’s *Towards 2020* vision.

1. World-leading regulation
2. Smarter systems
3. Well-informed industry

To find out more about *Towards 2020* go to:

www.dmp.wa.gov.au/towards2020



Andrew Chaplyn speaks at the Perth Human and Organisational Factors Forum.

THE FACTORS OF SAFETY

A famous British Prime Minister once said that those who fail to learn from history are doomed to repeat it.

The old saying resonates with Department of Mines, Industry Regulation and Safety Executive Director Resources Safety Simon Ridge, who believes strongly that we must be aware of human and organisational factors and the impact they can have on safety and health.

"If we are ignorant of these factors, then we will continue to make the mistakes we always have," he said.

Mr Ridge said this approach was not new and that the oil and gas sector and the aviation industry had probably run further with this sort of thinking.

"It recognises a fundamental truth behind the overwhelming majority of incidents in the resources industry," he said. "People don't deliberately try to put their safety at risk. "We have to ask ourselves the question – what leads people to make the decisions they make?"

The department has conducted research and held workshops with industry to develop the "top 11" human and organisational factors for the WA resources sector as a way to increase the focus on them.

Mines Safety Director Andrew Chaplyn sums them up as factors that impact on the reliability of people and systems.

"They are the key parts of the health and safety management system that can impact on a safe work environment," Mr Chaplyn said.

"It can be things like fatigue, training, competency, fit for purpose equipment and equipment design, but it also includes systems for when things do go wrong - like sound emergency response."

The department has been raising awareness about human and organisational factors for a number of years. However, the focus has increased significantly in the past 18 months.

In May, the department hosted two Human and Organisational Factor Forums – one in Perth, targeting the mining industry, and another in Karratha, targeting the petroleum industry.

The Perth event attracted more than 200 people, the largest number of attendees for a single-theme event hosted by Resources Safety.

"For one subject to attract well over 200 people was fantastic," Mr Chaplyn said.

The forum included presentations from the department, industry experts and regulatory colleagues from the Eastern States.

One such colleague was Tony Linnane, Director Mine Safety Performance, from the New South Wales Resources Regulator.

"We've done a lot of work with the Western Australian department over a long period of time and I think it is a really good illustration of two government departments working together to get better outcomes for both of us," Mr Linnane said.



Attendees at the Perth Human and Organisational Factors Forum.

He welcomed the opportunity to provide insights to both regulators about the challenges of addressing human and organisational factors.

“These factors are critical because they look at the ways organisations structure their business and design their work, but also the way that we as humans behave,” Mr Linnane said.

“That can have a really big bearing on whether or not risk control measures will prevent adverse work health and safety outcomes or not. It’s another piece in the puzzle.”

Mr Linnane said the popularity of the forum reflected the importance of understanding human and organisational factors.

“Mine operators are trying to work out what is the next step in terms of driving health and safety performance to better levels,” he said.

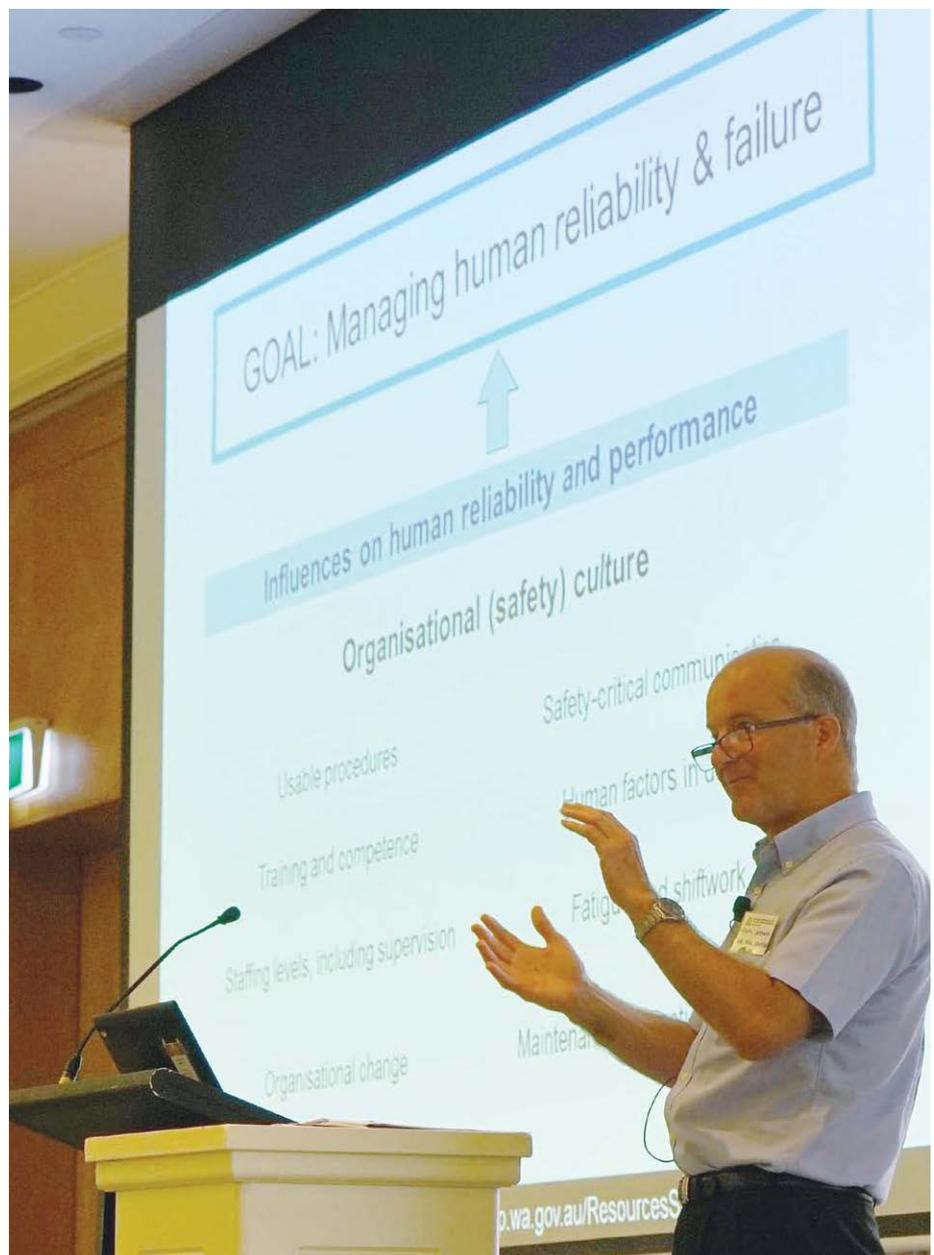
“It is about thinking smarter about how they manage risk. Knowing and understanding the effect that human and organisational factors have is really critical to that.”

According to Mr Chaplyn, continuing to collaborate through events such as forums will be an important part of increasing our understanding of how to address human and organisational factors.

“It is a great way to share ideas and help each other raise awareness in this area,” he said.

“It’s not something that you can just flick a switch and it changes tomorrow – but it can be integrated slowly into the system.”

To find out more about safety regulation in Western Australia’s resources industry go to www.dmp.wa.gov.au/ResourcesSafety ■



Ronny Lardner from the Keil Centre speaks at the Perth Human and Organisational Factors Forum.



SPOTLIGHT ON INNOVATION AT 2017 AWARDS FOR EXCELLENCE

The prestigious Department of Mines, Industry Regulation and Safety annual Awards for Excellence will this year – for the first time – include the Safety and Health Resources Sector Awards.

More than 40 nominations have been received for the 2017 awards and three expert panels of judges will assess each of them over the next few months before selecting the winners.

New to the Community Partnership Award judging panel this year is Allan James, an Aboriginal community leader with an extensive history of fostering social responsibility and community relations in the mining sector.

“I’m really looking forward to the opportunity to review each of the partnerships put forward, gain a greater appreciation for the various initiatives and the stakeholders involved, the value created and how each initiative works in practice,” Mr James said.

“A focus for me will be the sustainability aspect, the development of a program beyond a concept – the dynamic nature of the relationships and organisational partners and its overall longevity.”

“I will be interested to see how and if the partnership initiative fulfils a very real need, and if the project has gone a long way to addressing whatever societal need was identified.”

Commenting on the inclusion of the Safety and Health Resources Sector Awards, Resources Safety Executive Director Simon Ridge said he was looking forward to the judging process with great enthusiasm.

“I have been a judge for the former Chamber of Minerals and Energy WA awards process and it has always been exciting to see how innovative the industry is,” Mr Ridge said.

“We go into the process without any preconceptions. Innovation can take many forms, so we cannot afford to narrow our thinking as to how this might be demonstrated.

“We are all winners in this process and celebrating success is an award in itself. The award winners will rightfully be proud of the formal recognition of having risen to the top in a very competitive field.”

The newest member of the Golden Gecko Selection Committee, Environmental Protection Authority Chairman Dr Tom Hatton, brings more than 25 years of national and international research experience to the judging panel.

“I am honoured to assist in the recognition of excellence in environmental management,” Dr Hatton said. “As an environmental scientist, I am looking forward to the nominations reflecting innovation and advancements in best practice environmental protection.”

The Awards for Excellence winners will be announced at the Awards Ceremony on Thursday 26 October. To register your interest for tickets please send your details to excellenceawards@dmp.wa.gov.au ■

THE JUDGES



Community Partnership Resources Sector Award

- **Department of Mines, Industry Regulation and Safety Director General David Smith**

Mr Smith has more than 20 years of experience in the State and Commonwealth public service, including the Department of the Premier and Cabinet, Department of Treasury, Department of the Prime Minister and Cabinet and an overseas posting in Geneva with the Department of Foreign Affairs and Trade.

- **Former CEO of LotteryWest, Jan Stewart**

Ms Stewart was the CEO of LotteryWest for more than 20 years and oversaw the distribution of more than \$120 million in grants each year to a wide range of WA charities and community organisations.

- **Social Responsibility and Community Relations Strategist, Allan James**

Mr James is a Wongi/Yamatji man born and raised in the Northern Goldfields region of WA. He has successfully undertaken a number of management roles in the mining sector.

- **Chair of Diabetics Research Foundation of Western Australia, Dr Erica Smyth**

Dr Smyth has 40 years' experience within the mineral and petroleum sectors. She also serves on a number of community and research boards.



Golden Gecko Award

- **Department of Mines, Industry Regulation and Safety Director General David Smith**

(See left)

- **Environmental Protection Authority Chairman Dr Tom Hatton**

Dr Hatton has significant expertise in environmental science and its application to issues of State development.

- **Murdoch University Chancellor David Flanagan**

Mr Flanagan is a geologist with more than 25 years' experience in the multi-commodity mining and mineral exploration industry in Australia, Indonesia and West Africa.

- **WA Spatial Nexus Chair Rob Freeth**

Mr Freeth has over 35 years' experience in computing and information systems. He was Chair of the Western Australian Land Information System (WALIS) Advisory Council for five years.



Safety and Health Resources Sector Awards

- **Department of Mines, Industry Regulation and Safety Executive Director Resources Safety Simon Ridge**

Mr Ridge is a qualified geologist and mining engineer with more than 40 years of experience in the resources sector.

- **Chamber of Minerals and Energy WA Deputy Chief Executive Nicole Roocke**

Ms Roocke has been responsible for coordinating industry input on a variety of government regulatory and policy issues and facilitating communication within the minerals and resources sector for 14 years.

- **BCG Contracting Chief Executive Officer Greg Heylen**

Mr Heylen has a commitment to ensuring best practice safety is embedded in the culture at BGC from the leadership group through to each person on the ground in the workforce.

AGRICULTURE

East Kimberley – Ord – Ord/East Kimberley Expansion Project**WA STATE GOVERNMENT**

The State Government has invested \$322m to construct irrigation channels, roads and off-farm infrastructure to encourage private investment in irrigated agriculture on the Ord lands in the East Kimberley Region. Kimberley Agricultural Investment (KAI), a subsidiary of China's Shanghai Zhongfu Group, is developing leased farm land on the Goomig Plain, with a future option to lease and develop the Knox Plain, a total of 13,400 ha. The State released a further 5,000ha of Ord West Bank and Mantinea lands in 2016 to KAI and TFS Corp. Ltd, established producers of sandalwood.

Expenditure: \$322m.

IRON ORE

**Pilbara – Cape Preston – Sino Iron
CITIC PACIFIC**

The Sino Iron project is located at Cape Preston, 100km south west of Karratha. The project will be the largest magnetite mining and processing development in Australia, with a mine life of more than 25 years. Six processing lines are now operational. The first shipment of magnetite concentrate to China occurred in late 2013. The project comprises in-pit crushers, a 29km slurry pipeline, with an annual capacity to produce up to 24 million tonnes of magnetite concentrate. The downstream processing facility has required significant investment in dedicated supporting infrastructure including a new port facility, a 51 gigalitre desalination plant and a 450 megawatt combined cycle gas fired power station.

Expenditure: \$11.1b.

Employment: Construction: 4000;
Operation: 1000

IRON ORE PROCESSING

**Pilbara – Cape Preston – Sino Iron
CITIC PACIFIC**

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Expenditure: \$11.1b.

Employment: Construction: 4000;
Operation: 1000

OIL & GAS DEVELOPMENTS

Carnarvon Basin – Greater Western Flank Phase 1**WOODSIDE ENERGY**

The Greater Western Flank Phase 1 Project to develop the Goodwyn GH and Tidepole fields, via a subsea tie-back to the existing Goodwyn A Platform has been successfully completed by Woodside Energy. First gas was produced from the Goodwyn GH field in late 2015 and production from the Tidepole field commenced in Q4 2016.

Expenditure: \$2.5b.

LITHIUM

**Kwinana – Tianqi Lithium Processing Project
TIANQI LITHIUM AUSTRALIA PTY LTD**

Tianqi Lithium Australia Pty Ltd holds a 51% interest in Talison Lithium, the operator of the Greenbushes mine in the South West of WA. The company has committed to a major expansion of the mine and the construction of a lithium hydroxide processing plant at the Kwinana Strategic Industrial Area, south of Perth. The processing plant will be constructed in two stages. The first stage will accommodate the production of 23,900tpa of lithium hydroxide and will occur between 2016-2018. The second stage will expand the plant to produce up to 47,800tpa of lithium hydroxide and will occur between 2018-2020. The final product will be shipped to customers in China. Lithium hydroxide is a highly-valued resource for industries involved in energy storage, hybrid vehicles, aviation and other technological industries.

Expenditure: \$608m.

Employment: Construction: 500; Operation: 115

OIL & GAS DEVELOPMENTS

Carnarvon Basin – Greater Western Flank Phase 2**WOODSIDE ENERGY**

The Greater Western Flank 2 Project was approved in December 2015 and will develop gas and condensate from the Keast, Dockrell, Sculptor, Rankin, Lady Nora and Pemberton fields via a subsea tieback to the existing Goodwyn platform. The project has awarded most major contracts and commenced manufacturing and fabricating key project infrastructure. The project is expecting start-up from the initial tranche of five wells in 2H 2019, with the remaining three wells expected in 1H 2020.

Expenditure: \$2.8b.

Carnarvon Basin – Persephone Project**WOODSIDE ENERGY**

Woodside Energy Ltd, as operator of the North West Shelf Joint Venture is developing the A\$1.2b Persephone gas field. The development involves two subsea wells and an 8km subsea tieback to the existing North Rankin Complex. Fabrication activities and offshore brownfield work has commenced, with start-up expected in Q3 2017.

Expenditure: \$1.2b.

Carnarvon Offshore Basin – Barrow Island – Gorgon Project**GORGON JOINT VENTURE**

The Gorgon Foundation Project on Barrow Island, now in its eighth year of construction, is a three train LNG development with a nameplate capacity of 15.6Mtpa and includes a domestic gas plant capable of delivering at least 300TJ/d of gas to the mainland. Cost estimates for the project construction are expected to total more than A\$55b. The project involves the processing of gas from both the Gorgon and Jansz/lo gas fields and includes potentially the largest commercial CO₂ geosequestration project in the world. Train one start up and first shipment of LNG commenced in March 2016. Train 2 produced first LNG in October 2016 and train three was commissioned in March 2017.

Expenditure: \$55b.

Employment: Construction: 8000;
Operation: 300

**Pilbara – Wheatstone LNG Development
CHEVRON AUSTRALIA PTY LTD**

Chevron Australia Pty Ltd as Operator of the Wheatstone Project is currently working towards the construction of two LNG trains, a domestic gas plant and port facilities at the Ashburton North Strategic Industrial Area near Onslow. The Project will initially produce 8.9Mtpa of LNG and have a 200TJ per day domestic gas plant connected to the Dampier-to-Bunbury Natural Gas Pipeline. The Project is targeting first LNG by mid-year 2017.

Expenditure: \$40b.

Employment: Construction: 7200;
Operation: 400

POWER STATIONS

**Boodarie Industrial Estate – South Hedland Power Station
TRANSALTA**

In July 2014, TransAlta Energy (Australia) Pty Ltd announced it will build, own and operate a 150 megawatt power station in South Hedland's Boodarie Industrial Estate. The plant will consist of a combined cycle gas plant, featuring both natural gas and steam turbines. The A\$570m investment will help meet the future energy needs of the region through a 25-year agreement with both Horizon Power and Fortescue Metals Group. The plant is being designed to allow for expansion and there is a possibility that other customers may be added in the future. Construction activities are largely complete and the project has now moved into the commissioning phase with an expected completion of mid-2017.

Expenditure: \$570m.

Employment: Construction: 250; Operation: 20

AGRICULTURE

East Kimberley – Project Sea Dragon SEAFARMS GROUP LIMITED

Seafarms Group is a Queensland based producer of farmed prawns. Seafarms proposes to invest up to US\$1.45b over the next eight years in Project Sea Dragon, a large scale, integrated, land based aquaculture project to produce black tiger prawns for export markets in Asia. The aquaculture component of the project will be located in the Northern Territory and is planned as a staged development commencing with Stage 1, 1,000 hectares of ponds and supporting infrastructure. In Western Australia a founder stock and quarantine centre is operational in Exmouth, a processing plant is proposed for Kununurra, and subject to competitive tender Wyndham port will be utilised for export and import. The project will create approximately 300 jobs in the Kimberley during construction, 150 direct jobs in the region at Stage 1 building to 700 direct jobs when fully operational. Seafarms Group expect to commence development during 2017.

HEAVY MINERAL SANDS

Shark Bay – Coburn Zircon Project STRANDLINE RESOURCES LIMITED

Strandline proposes to develop the Coburn zircon project, located south of Shark Bay and approximately 250km north of Geraldton. It contains total ore reserves of 308Mt at an average grade of 1.2 per cent heavy minerals, all of which lie within the portion of the project area that has received government environmental approvals for mining. At a mining rate of 23.4Mtpa, the project is expected to produce 49,500tpa of zircon, 109,000tpa of chloride ilmenite and 23,500tpa of a mixed rutile-leucoxene over its 19 year mine life. The company has secured all of the approvals required to commence mining and processing operations at Coburn, and is continuing to pursue discussions with parties interested in becoming a strategic partner in the project.

Expenditure: \$173m.
Employment: Construction: 170; Operation: 110

INFRASTRUCTURE

West Kimberley – Browse LNG Precinct WA STATE GOVERNMENT

The State Government is developing the Browse Liquefied Natural Gas (LNG) Precinct approximately 60km north of Broome. By focussing development at a suitable location, the Precinct will minimise the environmental footprint of gas processing and any social impacts in the region while maximising opportunities for the local community to benefit from development of the Browse Basin gas fields. The Precinct will have the capacity to accommodate at least two LNG processing operations, with a combined capacity of up to 50Mtpa. The State Government has acquired the land for the Precinct and will secure all relevant approvals to ensure the Precinct is 'project ready'.

IRON ORE

Pilbara – South Flank Project BHP BILLITON IRON ORE PTY LTD

BHP Billiton Iron Ore will require the development of an additional ore deposit to sustain production as the Yandi mine is exhausted over the next five to ten years. Development of the South Flank satellite high-grade ore body is currently the preferred long-term solution for replacement volumes of up to 80 million tonnes per annum. South Flank is located approximately 130 km by road north-west of the town of Newman, and adjacent to the Company's existing Mining Area C operation. The proposed project would establish mining operations at South Flank and transport ore to an expanded Mining Area C hub for processing and onward logistics. The proposed project is currently in study phase and is subject to a number of internal and external approvals.

Pilbara – Balla Balla Infrastructure Project BALLA BALLA JOINT VENTURE

The Balla Balla Infrastructure project proposes to construct and operate a 165km railway connecting the Flinders Mines Ltd's Pilbara Iron Ore Project, located in the central Pilbara as its foundation customer, to a proposed transshipment and stockyard facility at Balla Balla, situated midway between Karratha and Port Hedland. The Railway (BBI Rail Aus Pty Ltd) Agreement 2017 was executed between the State, the Company and the Guarantors on 23 January 2017. The State Agreement will now form part of a Bill to be introduced into Parliament before September 2017.

Expenditure: \$5.6b.
Employment: Construction: 3300; Operation: 900

Pilbara – West Pilbara Iron Ore Project API MANAGEMENT PTY LTD

The Australian Premium Iron Joint Venture is proposing to develop the West Pilbara Iron Ore Project. Stage 1 of the project is based on the production of 40Mtpa of direct shipping iron ore from deposits, including Red Hill and Mt Stuart deposits, located 35-80km south west of Pannawonica. The ore is proposed to be transported by a 282km heavy haul railway for export via the proposed multi-user port at Anketell. State and Federal environmental approvals for the mine, rail and port elements of the project are in place. Subject to the successful completion of feasibility studies, and receipt of final regulatory approvals, the company anticipates construction to commence following a decision to proceed by the joint venturers and completion of funding arrangements.

Expenditure: \$6.8b.
Employment: Construction: 1500;
Operational: 900

OIL & GAS DEVELOPMENTS

Canning Basin – Buru Canning Basin Tight Gas

BURU ENERGY

The Buru Energy/Mitsubishi joint venture (JV) is appraising the commercial potential of the Laurel Formation, a large onshore natural gas resource located in the Canning Basin. Following the successful completion of the 2015 tight gas stimulation program on and near Noonkanbah Station, Buru commissioned DeGolyer and MacNaughton, a specialist tight gas and unconventional resource assessment consulting group to undertake an independent assessment of the gas and liquids potential of the Laurel Formation in the Valhalla area. This independent assessment has confirmed that the region contains a significant wet gas accumulation. The JV recently executed native title Agreements with the Yungngora and Warlanguru people covering the recently tested Asgard and Valhalla wells. The agreements provide for, amongst other matters, the support of the Yungngora and Warlanguru people for the future grant of the tenure required for the further development of the gas resources in the area. The Yungngora agreement has now been registered with the National Native Title Tribunal.

Expenditure: \$40m.
Employment: Construction: 100; Operation: 30

URANIUM

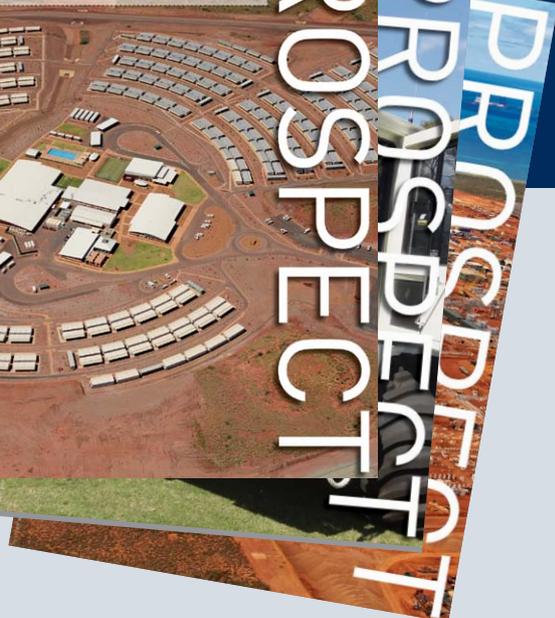
Northern Goldfields – Yeelirrie – Yeelirrie Uranium

CAMECO AUSTRALIA PTY LTD

Cameco Australia proposes to develop the Yeelirrie project in the North-eastern Goldfields, near Wiluna. The project entails open cut mining of shallow deposits of uranium ore, treatment in a plant to be established at the site, and development of associated infrastructure. The project will process up to 2.4Mtpa of uranium ore over about 17 years. The resultant uranium oxide is to be transported to South Australia by road for export to overseas markets. The project received environmental approval on 16 January 2017. Cameco will advance the project at a pace aligned with market conditions.

Employment: Construction: 500; Operation: 225

PROSPECT



Significant resource projects in Western Australia

Western Australia continues to lead the way as Australia's premier resources investment destination. There are more than A\$120 billion worth of projects either committed or under consideration for the State during the next few years. These would create more than 21000 construction jobs and almost 3000 permanent jobs.

This section is intended as an overview and does not constitute an exhaustive list of projects within the Western Australia resources industry. Based on company announcements.

Significant Projects as at April 2017

	Project Value (estimated A\$m)	Employment	
		Construction	Permanent
Iron and Steel			
API Management Pty Ltd – West Pilbara Iron Ore Project	6800	1500	900
CITIC Pacific – Cape Preston Mine & Processing Projects	11100	4000	1000
South Flank	n/a	n/a	n/a
Sub Total	17900	5500	1900
Oil, Gas and Condensate			
Browse LNG Precinct	n/a	n/a	n/a
Buru Energy – Buru Canning Basin Tight Gas	40	100	30
Chevron – Wheatstone LNG	40000	7200	400
Gorgon Joint Venture Gas Processing Project	55000	8000	300
Woodside Energy – Greater Western Flank Phase 1	2500	n/a	n/a
Woodside Energy – Greater Western Flank Phase 2	2800	n/a	n/a
Woodside Energy – Persephone	1200	n/a	n/a
Sub Total	101540	15300	730
Other			
Cameco Australia – Yeelirrie Uranium	n/a	500	225
Ord East Kimberley Expansion Project	322	n/a	n/a
TransAlta – South Hedland Power Station	570	250	20
Sub Total	892	750	245
TOTAL	120332	21550	2875

All currency figures are in Australian dollars unless otherwise specified.

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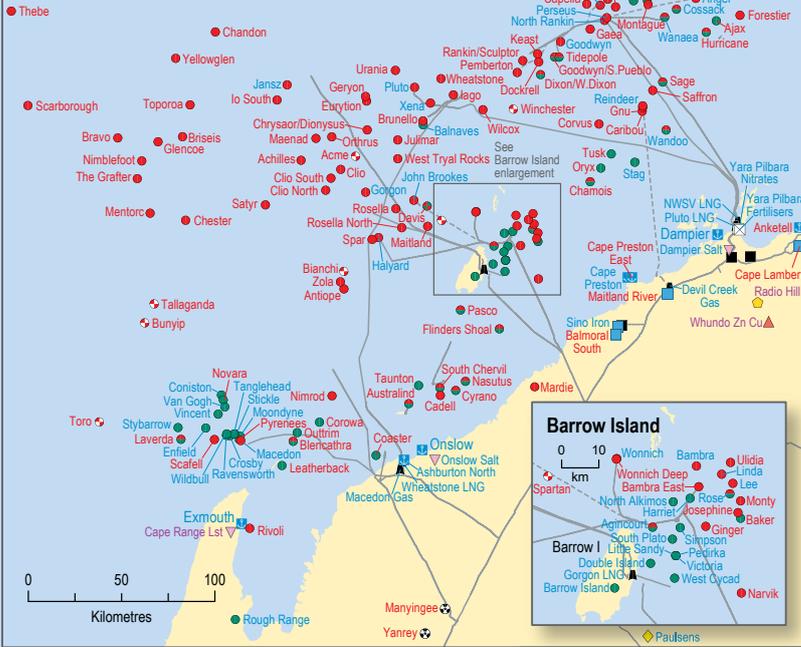
If your contact details are changing or have changed you can now update them online.

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Abbreviations Key

b	billion	m	million
EPC	Engineering, Procurement and Construction	Mt	million tonnes
GL	gigalitres	Mtpa	million tonnes per annum
ha	hectares	MW	megawatts
JV	joint venture	t	tonnes
km	kilometres	THM	total heavy mineral
LNG	liquefied natural gas	TJ	terajoules
LOA	length overall	tpa	tonnes per annum

North West Shelf



Major Resource Projects

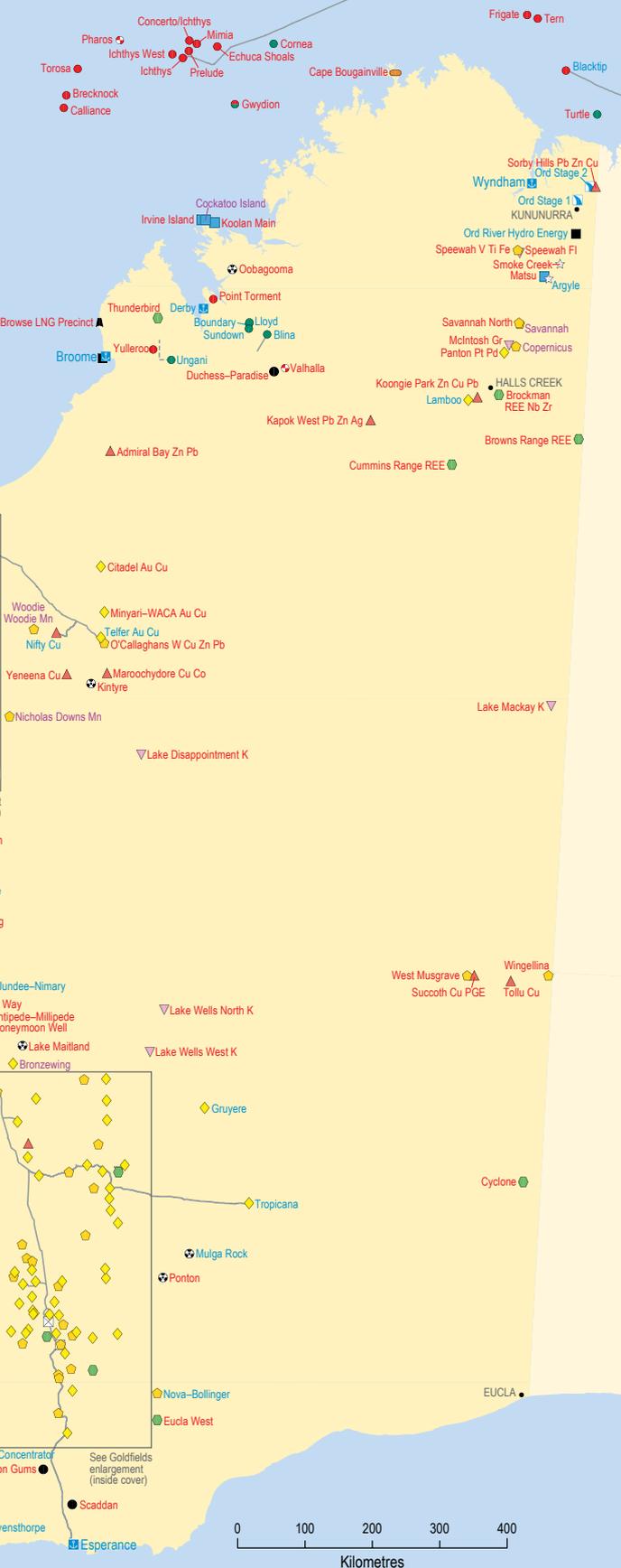
June 2017

Project labels:

Projects operating or currently under development with an actual or anticipated value of production greater than A\$10 Million are shown in blue

Proposed or potential projects with a capital expenditure greater than A\$20 Million are shown in red

Projects under care and maintenance are shown in purple



Commodities

- Ag..... Silver
- Au..... Gold
- Co..... Cobalt
- Cu..... Copper
- Dmd..... Diamond
- Fe..... Iron
- Fl..... Fluorite
- Gp..... Gypsum
- Gr..... Graphite
- Grt..... Garnet
- K..... Potassium
- Kin..... Kaolin
- Li..... Lithium
- Lst..... Limestone
- LNG..... Liquefied natural gas
- Mn..... Manganese
- Nb..... Niobium
- Ni..... Nickel
- Pb..... Lead
- Pd..... Palladium
- PGE..... Platinum group elements
- Pt..... Platinum
- REE..... Rare earth elements
- Ta..... Tantalum
- Ti..... Titanium
- V..... Vanadium
- W..... Tungsten
- Zn..... Zinc
- Zr..... Zirconium

Mineral symbols

- ☆ Precious mineral
- ◇ Precious metal
- ◆ Steel alloy metal
- Speciality metal
- ▲ Base metal
- Iron
- Alumina
- Coal and lignite
- ⊕ Uranium
- ▽ Industrial mineral
- ⊠ Processing plant

Petroleum symbols

- Gas field
- Oil field
- Oil and gas field
- ◇ Significant gas discovery
- ◇ Significant oil discovery
- Significant oil and gas discovery
- ▲ Processing plant
- Oil / gas pipeline, operating
- - - Oil / gas pipeline, proposed

Infrastructure

- Power plant
- ▬ Irrigation / water / desalination
- ⊠ Port

Enquiries for latest information for Commonwealth controlled waters is available from the National Offshore Petroleum Titles Administrator (NOPTA) at <info@nopta.gov.au>



Government of Western Australia
Department of Mines and Petroleum