

1 October 2015

Chairman  
Legislative Assembly Economics and Industry Standing Committee  
Parliament of Western Australia  
Parliament House  
PERTH WA 6000

Dear Mr Blayney,

**RE: Inquiry into technological and service innovation in Western Australia**

The Australian Petroleum Production & Exploration Association (APPEA) is the peak national body representing Australia's oil and gas exploration and production industry. APPEA has around 80 full member companies exploring for and producing Australia's oil and gas resources. These companies currently account for around 98 per cent of Australia's total oil and gas production and the vast majority of exploration. APPEA also represents over 240 associate member companies providing a wide range of goods and services to the industry.

APPEA welcomes the opportunity to provide comments to the Economics and Industry Standing Committee *Inquiry into technological and service innovation in Western Australia*. This letter provides some general comments related to the Inquiry's terms of the reference. APPEA's comments should be considered in conjunction with submissions provided by our full and associate members.

**Key Points**

1. Innovation and continuous improvement are core to the Australian oil and gas industry's current position and its future competitiveness.
2. There is a diverse oil and gas research and development ecosystem in WA with elements of global standing in innovation and service delivery.
3. WA has the opportunity to build on this foundation in areas such as plant operations and maintenance, and offshore/subsea infrastructure as Australia transitions to become the world's largest LNG exporter and further develops its onshore sector.
4. The State should seek to play a national leadership role in relevant Commonwealth initiatives such the proposed Oil, Gas and Energy Resources Growth Centre.

**Introduction**

Innovation and continuous improvement has underpinned the commercialisation of Australia's oil and gas resources over many decades. Finding and developing resources in remote offshore and onshore locations and bringing these resources to markets hundreds and sometimes thousands of kilometres away, has necessitated innovative solutions across the gas supply chain.

These innovations led to more than \$200 billion being committed for investment over the period 2009 to 2017 in what will soon be the world's largest, most modern and technologically advanced LNG industry. The next three years will see the number of Australian LNG trains expand threefold from seven in mid-2014 to 21 by 2018, with more than half of these LNG trains operating in Western Australia. This includes the world's first large scale Floating LNG project (Prelude) and the world's largest CO2 geo-sequestration project (Gorgon).

In the State's emerging unconventional gas sector, local innovation efforts are beginning to bear fruit. For example, Condor Energy, a local WA oil field services company, assumed responsibility in 2013 for the fluids laboratory at Curtin Universities School of Chemical and Petroleum Engineering. The laboratory is used to test and design locally developed fluids for use in the petroleum, in collaboration with the university. This initiative helps to develop future energy industry engineers and personnel within the domestic market.

### **Becoming the world's largest LNG exporter: the transition to Operations and Maintenance**

This enormous investment to date in LNG production capacity will be overshadowed by the estimated \$450 billion of ongoing investment required to sustain the industry for the next 25 years<sup>1</sup>. This offers an opportunity for the Australian services industry to capitalise on a period of sustainable long-term growth, with maintenance and support contracts tending to last significantly longer than construction phase contracts.

Through this transition phase, the oil and gas industry is strongly focused on ensuring that it has the capacity, capability and competitiveness to not only drive world class project operations, but to attract further brownfield and FLNG investment in additional LNG capacity. Collaboration with universities and governments in research and development initiatives remains a critical strategy to drive technological innovation.

### **WA Oil & Gas Innovation Ecosystem**

There is a strong ecosystem in Western Australia focused on oil and gas research and development. This ecosystem includes initiatives directly focused on the oil and gas industry and those whose remit is much broader, but with direct application to the industry. Figure 1 below maps the various initiatives established that link together industry, government and universities. Further detail on individual initiatives is provided in Appendix 1.

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<sup>1</sup> Accenture, 2015, *Ready or Not? Creating a world-leading oil and gas industry in Australia*

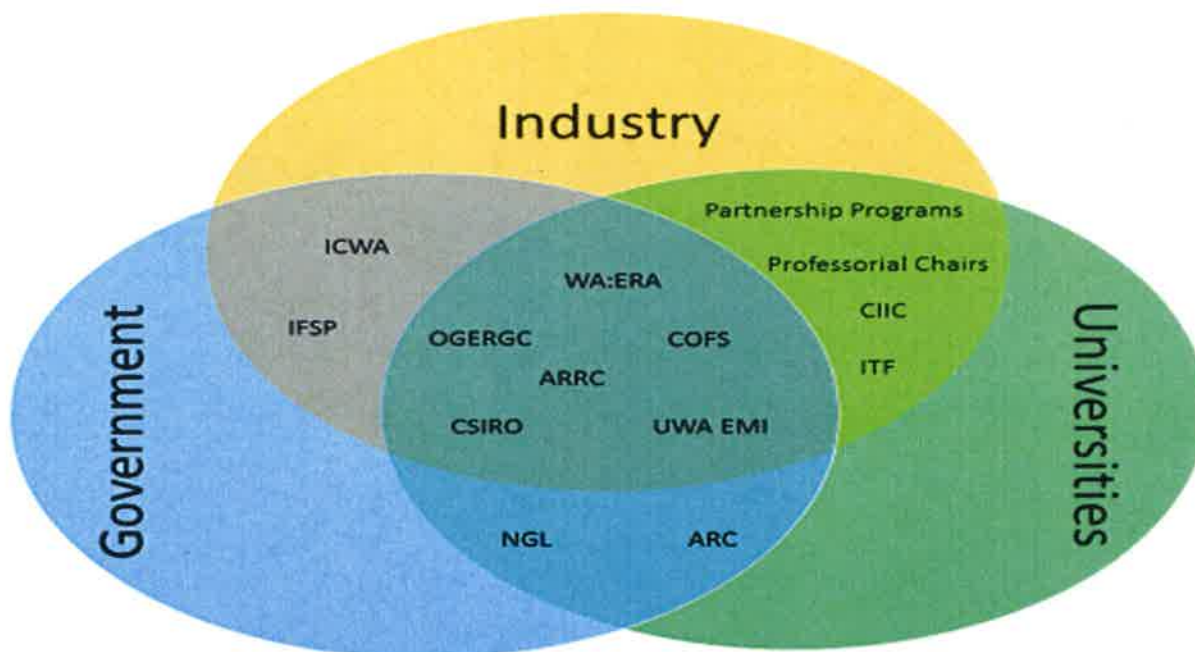


Figure 1: WA Oil and Gas Research and Development Ecosystem

These initiatives play a vitally important role in driving research into innovative solutions for the oil and gas industry in a way that delivers value for the industry, government and researchers.

APPEA considers that the proposed national Oil, Gas and Energy Resources Growth Centre could be a suitable forum to further define and implement an over-arching strategy to build on these initiatives. APPEA has collaborated during the consultation phase for the centre to help define its priorities and we welcome the WA:ERA bid and State Government support to host its headquarters.

#### WA's areas of competitive advantages

Australia's higher education and training sector continues to show strong improvement with the World Economic Forum recently increasing its ranking for the global strength of our education sector from 15<sup>th</sup> in 2013-14 to 11<sup>th</sup> in 2014-15<sup>2</sup>. This is consistent with the recent Deloitte Access Economics report that included education as one of Australia's "fantastic five" growth sectors of the economy, along with gas<sup>3</sup>.

APPEA continues to support initiatives aimed at strengthening science, technology, engineering and mathematics (STEM) education in WA schools. STEM education programs, such as those

<sup>2</sup> World Economic Forum 2015, *The Global Competitiveness Report 2014–2015*

<sup>3</sup> Deloitte Access Economics 2013, *Positioning for prosperity? Catching the next wave*, p. 11

conducted by Earth Science WA<sup>4</sup> and proposed by STEM-WA<sup>5</sup>, are critical to develop the necessary pool of talent for an industry which is at the forefront of science, technology and innovation.

Western Australia has a real opportunity to leverage the expertise and scale of activity to position Perth as a global or regional centre of excellence in, for example efficient plant operations and offshore infrastructure design, installation and maintenance. This is well recognised in the Science Statement for Western Australia<sup>6</sup>. The challenge will be to move quickly to identify those areas where Western Australia has a unique competitive advantage. Global supply chains are already positioning themselves to be the providers of choice to Australia's offshore sector<sup>7</sup>.

### Plant operations and maintenance

With more than half of Australia's LNG trains operating in Western Australia at the end of the current expansion period, industry will be focused on ensuring plants operate at optimal safe levels.

Processing optimisation is just one of the areas that Chevron's Perth Global Technology Centre (GTC) is focusing on<sup>8</sup>. Chevron selected Perth as the location of its second GTC due to its source of talented regional technology experts, proximity to the Chevron operated Gorgon and Wheatstone developments and growth opportunities to pursue research and development alliances with universities and industry partners.

Woodside's recent partnership with Curtin University and CISCO is a further example of investment in innovation in plant operations, combining remote monitoring technologies and 'big data'<sup>9</sup>. Woodside's Plant of the Future links process plant design with artificial intelligence, data analytics and advanced sensors and control systems to drive environmentally compliant, safe and cost efficient production of remote resources.

As noted in the recent Accenture report, if LNG operators were to collaborate on the timing of turnarounds to optimise resource demands and availability for each plant, Accenture estimates that the industry could save around \$74-\$84 million per annum<sup>10</sup>. Analysis shows that each turnaround would conservatively be on average two days shorter, resulting in an up to \$40 million per annum reduction in unplanned deferment across the industry and could save between \$34-\$44 million in turnaround execution costs.

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<sup>4</sup> See: [www.earthsciencewa.com.au/](http://www.earthsciencewa.com.au/)

<sup>5</sup> See: [www.stawa.net/wp/wp-content/uploads/2015/07/STEM-WA-PILOT-PROGRAM-PROPOSAL-FINAL-14.8.15.pdf](http://www.stawa.net/wp/wp-content/uploads/2015/07/STEM-WA-PILOT-PROGRAM-PROPOSAL-FINAL-14.8.15.pdf)

<sup>6</sup> See: [www.dpc.wa.gov.au/science/Documents/DPC.statement.web.pdf](http://www.dpc.wa.gov.au/science/Documents/DPC.statement.web.pdf)

<sup>7</sup> See: [www.intsok.com/index.php/Market-info/Markets/Australia](http://www.intsok.com/index.php/Market-info/Markets/Australia)

<sup>8</sup> See: [www.chevronaustralia.com/our-businesses/technology-leadership-and-partnerships/global-technology-centre](http://www.chevronaustralia.com/our-businesses/technology-leadership-and-partnerships/global-technology-centre)

<sup>9</sup> See: [www.research.curtin.edu.au/about/institutes-centres/cisco-internet-of-everything-innovation-centre/](http://www.research.curtin.edu.au/about/institutes-centres/cisco-internet-of-everything-innovation-centre/)

<sup>10</sup> Accenture, 2015, *Ready or Not? Creating a world-leading oil and gas industry in Australia*

There are clear opportunities to build on these initiatives and the synergies associated with remote operations excellence in the state's mining industry and the supercomputing capacity built through the Square Kilometer Array project.

### Offshore infrastructure

Collectively, there is a substantial amount of offshore/subsea installation and maintenance work that Western Australian suppliers have the capacity and capability to be involved in. Indeed, the most recent WA Department of Commerce Local Content Report outlines around \$2.5bn in local contract spend over the preceding four years on offshore infrastructure and marine support services alone<sup>11</sup>.

An example of Western Australia's global research expertise is the University of Western Australia's Centre for Offshore Foundations Systems (COFS). COFS is frequently recognised in the Premier's Science Awards for its groundbreaking and practical research. In announcing recent awards, the Premier recognised that the Centre has built a world-class research group in WA, attracting industry investment and providing practical solutions to real-world problems<sup>12</sup>.

COFS is home to the Shell EMI Chair in Offshore Engineering. This initiative aims to strengthen Western Australia's position as a global offshore engineering hub, through world-class research and education spanning offshore engineering, from geotechnics to metocean. A key aim is to realise Australia's first mover advantage in the expertise of efficient FLNG operations.

These initiatives (and others) have strong interlinkages with WA's marine science sector, an area highlighted in the WA Science Statement where the state has strong capabilities. Collaboration between the offshore engineering and marine science sectors can support further innovation in the oil and gas industry.

### **Research & Development Enablers**

The proposed Oil, Gas and Energy Resources Growth Centre presents the most obvious model through which technological and service innovation could be facilitated and encouraged. There are examples of other local and international initiatives that the WA Government could consider as part of its support of the Growth Centre.

The WA Department of State Development recently brought together resource sector stakeholders for a series of workshops on Resource Sector Technology. The purpose of the workshops was to discuss automation, big data and a range of related innovations in WA's resource industry; determine if Perth has any global advantages in this space; and if there is a

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<sup>11</sup> See: [www.commerce.wa.gov.au/sites/default/files/atoms/files/local\\_content\\_report\\_may\\_2014.pdf](http://www.commerce.wa.gov.au/sites/default/files/atoms/files/local_content_report_may_2014.pdf)

<sup>12</sup> See:

[www.mediastatements.wa.gov.au/pages/StatementDetails.aspx?listName=StatementsBarnett&StatId=7978](http://www.mediastatements.wa.gov.au/pages/StatementDetails.aspx?listName=StatementsBarnett&StatId=7978)  
and [www.mediastatements.wa.gov.au/Pages/Barnett/2015/08/Premier-congratulates-Science-Award-winners.aspx](http://www.mediastatements.wa.gov.au/Pages/Barnett/2015/08/Premier-congratulates-Science-Award-winners.aspx)

meaningful role for government to be involved. APPEA and a number of members participated in the workshops and look forward to progressing the outcomes.

Accenture and GE have recently started bringing operators and service providers together to share challenges, with the aim to encourage collaboration amongst operators and help drive innovation and enhanced capability in businesses servicing the oil and gas industry. As noted above, there is quantifiable benefits to be obtained through closer collaboration.

In a similar vein, albeit with a research and development focus, the Scottish Government established the Oil and Gas Innovation Centre (OGIC) as one of its national Innovation Centres<sup>13</sup>. Based in Aberdeen, the OGIC brings top quality research and development expertise to the oil and gas industry's innovation challenges. The OGIC is focused on eight technology areas identified by the industry. The Centre has access to academics, researchers and facilities at Scotland's 14 universities.

The OGIC is, in essence, a problem solving forum. Oil and gas companies come to OGIC with a particular operational challenge. OGIC helps to identify expertise within the universities and invites the universities to "bid" for the opportunity to develop a solution to the challenge presented. OGIC also assists companies with funding, technical know-how and project management resources. OGIC has standardised confidentiality and commercial agreements developed with the universities, to minimise the time required to formalise partnership arrangements and speed up the deployment of new products.

## Conclusion

Technological and service sector innovation will play a key role in making the most of Western Australia's position at the centre of an unprecedented national transition to be the world's leading LNG producer. Being a global leader is about getting better and better at what we do, not just being the biggest exporter. Innovation, technology and reducing costs structures are essential in this lower oil price environment both for the mature offshore industry but also for the State's emerging unconventional gas industry. Industry is committed to sustaining innovation in the way it does business in collaboration with research organisations, universities and governments.

To discuss any aspect of APPEA's comments, please contact Adam Welch, Senior Policy Adviser at [awelch@appea.com.au](mailto:awelch@appea.com.au) or 9426 7205.

Regards,



**Stedman Ellis**  
Chief Operating Officer – Western Region

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<sup>13</sup> See: [www.ogic.co.uk](http://www.ogic.co.uk)

APPENDIX 1

Western Australian Collaborative Initiatives

Acronym	Initiative	Leader	Website
ARC	Australian Research Council	Commonwealth Government	<a href="http://www.arc.gov.au">www.arc.gov.au</a>
ARRC	Australian Resources Research Centre	CSIRO/Curtin	<a href="http://www.rrc.net.au/about-arrc">www.rrc.net.au/about-arrc</a>
CIIC	Cisco Internet of Everything Innovation Centre	Curtin	<a href="http://www.research.curtin.edu.au/about/institutes-centres/cisco-internet-of-everything-innovation-centre/">www.research.curtin.edu.au/about/institutes-centres/cisco-internet-of-everything-innovation-centre/</a>
COFS	Centre for Offshore Foundation Systems	UWA	<a href="http://www.cofs.uwa.edu.au">www.cofs.uwa.edu.au</a>
CSIRO	Commonwealth Scientific and Industrial Research Organisation	Commonwealth Government	<a href="http://www.csiro.au">www.csiro.au</a>
ICWA	Innovation Centre WA	WA Government	<a href="http://www.innovation.wa.gov.au">www.innovation.wa.gov.au</a>
IFSP	Industry Facilitation and Support Program	WA Government	<a href="http://www.commerce.wa.gov.au/industry-and-innovation/industry-facilitation-and-support-program">www.commerce.wa.gov.au/industry-and-innovation/industry-facilitation-and-support-program</a>
ITF	Industry Technology Facilitator	ITF Ltd	<a href="http://www.oil-itf.com">www.oil-itf.com</a>
OGERG	Oil, Gas and Energy Resources Growth Centre	Commonwealth Government	<a href="http://www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/GC-Oil-Gas-and-Energy-Resources.aspx">www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/GC-Oil-Gas-and-Energy-Resources.aspx</a>
NGL	National Geosequestration Laboratory	Commonwealth Government	<a href="http://www.ngl.org.au">www.ngl.org.au</a>
UWA EMI	University of Western Australia Energy and Minerals Institute	UWA	<a href="http://www.emi.uwa.edu.au">www.emi.uwa.edu.au</a>
WA:ERA	Western Australian Energy Research Alliance	WA:ERA	<a href="http://www.waera.com.au">www.waera.com.au</a>
	Partnership Programs Professorial Chairs	Industry	<a href="http://www.chevronaustralia.com/community/education-partnerships/university-partnerships">www.chevronaustralia.com/community/education-partnerships/university-partnerships</a> <a href="http://www.shell.com.au/aboutshell/who-we-are/shell-au/operations/upstream/prelude/building-capacity-through-effective-partnerships.html">www.shell.com.au/aboutshell/who-we-are/shell-au/operations/upstream/prelude/building-capacity-through-effective-partnerships.html</a> <a href="http://www.woodsides.com.au/Working-Sustainably/Science-and-Technology/">www.woodsides.com.au/Working-Sustainably/Science-and-Technology/</a> <a href="http://www.atse.org.au/Documents/Events/SA%20Manufacturing/christian-lange-building-domestic-capability.pdf">www.atse.org.au/Documents/Events/SA%20Manufacturing/christian-lange-building-domestic-capability.pdf</a>