About Future Directions International

Future Directions International is an independent, not-for-profit Research Institute established to conduct comprehensive research of important medium to long-term issues facing Australia. FDI’s primary aim is to provide informed, balanced advice, which ultimately will result in policy changes that will enhance the quality of strategic decisions at senior levels of the public and private sectors in Australia for the benefit of all Australians.

Future Directions International (FDI) has two roles: to ensure that Australians recognise they are part of a two-ocean continent and that West Australians see themselves belonging to a dynamic, national entity in a developing region of the world.

Much of Australia’s external focus has centred on the Pacific, Southeast and Eastern Asia. With its developing wealth, increasing population, evolving trade and shipping capabilities and expanding geographic, political and security significance, however, the Indian Ocean and its littoral states will play an increasingly important role in Australia’s future.

Western Australia is entering an unprecedented period of wealth and development. For this to be sustained, however, Australians need to understand the challenges and opportunities they face, nationally, regionally and globally.

To achieve these outcomes, leaders and their policy makers and implementers need to be aware of the geo-strategic complexities of their region. With this in mind, FDI has established four areas of research that embrace the following:

- Developments in the Indian Ocean Region, including its littoral states;
- Meeting Australia’s energy requirements by 2030;
- Developments in Northern Australia and their impact on the economy, population, infrastructure, environment, security and foreign relations; and
- Implications for Australia of the developing global food and water crises

FDI will continue to ensure that its product is passed to an increasing number of Associates who will benefit from its future looking research. In so doing, FDI is establishing itself as an Australian centre of excellence in these four areas.

Launched in 2000 as the Centre for International Strategic Analysis (CISA), by the then former Governor of Western Australia, Major General the Honourable Michael Jeffery, AC, AO (Mil), CVO, MC (Retd). FDI has since grown over the past decade to become a respected Australian research institute. As a Perth-based independent research institute for the strategic analysis of Australia’s global interests, FDI has proven itself to be a centre of ongoing influence in shaping government policy and public discussion.
Pilbara Prospects 2020
Developments and Challenges for the Region

Future Directions International
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Northern Australia, that area lying north of the Tropic of Capricorn, provides a wealth of economic opportunities for our nation. The region is also strategically important for the vital role it plays in border protection and as an interface for broader engagement with neighbouring states and the wider region.

Northern Australia covers nearly three-million square kilometres and, if it was a country in its own right, it would be the eighth largest in the world. Energy and minerals, water resources, fisheries, tourism and the agricultural and pastoral sectors all contribute, or have the potential to contribute significantly, to its economic wealth and developmental potential.

Along with opportunities however, come some challenges. These include the need for better services, tackling environmental pressures, ensuring a sustainable population with adequate electoral representation, developing soil and water resources and improved infrastructure.

For all the above reasons, a detailed assessment of the factors shaping Northern Australia’s development is important, based on the following question:

‘What global, regional and domestic conditions over the coming decades will influence Australia’s options in developing the North?’

The following major factors will be investigated:

- Determining the potential of the resources sector, including minerals and energy, the agricultural and pastoral sectors, tourism, fisheries and water.
- Considering the security and geostrategic issues, including the threats, risks and challenges to developing the region determining appropriate counter measures.
- Identifying governance structures that would best allow Northern Australia to realise its full economic potential.
- Identifying the opportunities of developing the region for all of Australia.
- Population, employment, value added incentives to work.

This Landmark Study examines some of these issues. Clearly it is a work in progress with more to follow. The research is unique; in examining the potential and challenges of Northern Australia over such a timeframe.

I commend FDI for its initiative with this publication and look forward to seeing more of its important, analytical outcomes.

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Major General the Honourable Michael Jeffery AC, AO (Mil), CVO, MC (Retd)
Chairman, Future Directions International
(Former Governor General of Australia)
Introduction

Australia is experiencing an unprecedented expansion of its minerals and energy sectors. The region of northwest Western Australia is a significant part of this outcome. Much of this involves on- and off-shore facilities that are vulnerable to natural disasters, industrial accidents and, potentially, acts of sabotage and other forms of violence and destruction.

A relatively minor disruption may result in a significant and costly loss of production. Nor is the cost restricted to export earnings: loss of employment, environmental damage and the impact on local, regional and national economies cannot be under-estimated.

To help prevent and alleviate such disasters, Australia requires a national capability. This capability must be able to plan for such disasters. It must have an analytical and research capacity, the ability to develop the necessary doctrine and capabilities and the authority to deploy and direct assets.

Capabilities require time to develop. This involves not only identifying the personnel needed but also considerations relating to doctrine, training and preparation, equipment and communications and aspects of command and control.

Many of these capabilities will not necessarily be dedicated to disaster or emergency management. Instead they will include existing national and state emergency and security forces as well as health, communications, transport and other agencies. Well-established disaster management forces within the private sectors should also be incorporated.

For all the above reasons, a detailed knowledge of the factors shaping Northern Australia is important. Accordingly, FDI asks the following questions:

   a) The national importance of the Pilbara region of Western Australia from now until 2020;
   b) The damage and disruption that may result from natural disasters, industrial accidents and human acts of violence and the areas or activities that are most vulnerable to such acts; and
   c) The effectiveness of national, regional and local entities to deal with such emergencies, to identify deficiencies and to recommend measures to overcome such deficiencies.

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Developments in the Region: A Growth and Impediment Assessment

Liam McHugh
Northern Australia & Energy Security Research Programmes

KEY POINTS

• The Pilbara Region of north-west Australia is of significant economic and strategic importance to state and national interests. Over the coming decades, social, economic and political trends will consolidate, and potentially strengthen this status.

• While currently concentrated on the minerals and energy sectors, strategies are being developed and policy implemented to expand the economy towards a more mature and diversified economic profile.

• According to the Pilbara Planning Commission, expansion and diversification of the regional economy will compound the Pilbara’s annual growth rate to approximately five per cent, supporting a population of 62,000 by 2020.

• Economic and demographic changes will provide an impetus to civic-social development. Current indigenous, educational and health care deficiencies will be mitigated by government initiatives.

• Despite positive projections, however, issues remain. Population growth, critical infrastructure, the region’s monoculture economy, land rights and bureaucracy may ultimately constrain and inhibit development.
Summary

The Pilbara Cities vision represents a unique and ambitious project. Government and industry have demonstrated a dedication to the development of the region with significant financial and political outlays. Bolstered by the state government’s Royalties for Regions and resource developments, the economic and demographic profile of the Pilbara to 2020 seems ostensibly secure.

For the Pilbara Cities vision to be realised solutions to current and forecast challenges must be negotiated. To support the region’s continued economic prosperity, a population policy that provides incentives to settle in the Pilbara is urgently required. The complex issues of Indigenous affairs and Native Title require continued focus and dialogue. Finally, current deficiencies in critical infrastructure, water and governance structures must be resolved.

Analysis

Encompassing 507,896 square kilometres (including offshore islands), the Pilbara spans the breadth of central Western Australia.

The region is rich in minerals, hydrocarbons, fisheries, agricultural and tourism assets. Aided by its proximity to emerging and existing high demand markets, the region has been called “the engine room of the Australian economy” and is of significant economic and geostrategic importance to state and national interests.

In an effort to expand the resident population and diversify the economic base, the West Australian Government has developed the Pilbara Cities vision. The Royalties for Regions-inspired scheme aims to capitalise on the region’s economic credibility, proposed infrastructure provisions, unique character and environment.

Expansion in the resources, agricultural, tourism and fisheries sectors, along with complementary developments in the provision of services, are expected to transform the region from a “residential quarry” to a desirable and resilient population centre.

While Niels Bohr’s famous adage “prediction is very difficult, especially if it’s about the future” is apt, current developments provide an insight into policy priorities and challenges for the region to 2020.

Developments

Despite possible market volatilities and new competing sources of commodities, the minerals and energy sector will continue to expand.

Iron ore will remain a high growth industry as market opportunities for emerging “junior” players expand. Current operations will be augmented by the Solomon, Roy Hill and West Pilbara Iron Ore projects, which will serve to meet projected demand from continued urbanisation and industrialisation in Asia.

Industry will place significant emphasis on, and investment in, remote computer access centres for product extraction and management. The “Mining for the Future” initiative, pioneered by Rio Tinto, will streamline mine, plant, rail, port and utility management from a base in Perth, a practice likely to be refined and replicated by others over the next decade.

1 Regional Development Australia, Preliminary Pilbara Regional Plan, August 2010, p.30.
The oil and gas industry will also continue to expand. The North West Shelf project will be complemented by the Pluto, Gorgon and Wheatstone projects during the next decade. In April 2011, Resources Minister Martin Ferguson announced an increase in the exploration acreage for offshore oil and gas, a development that has the potential to expand the Pilbara’s oil and hydrocarbon industry. The search for new reserves will continue to be of the highest national priority, with an increasing trade deficit in the sector projected to reach $30 billion by 2015.²

Other commodities will remain stable, with uranium a potential growth industry.

The agricultural and pastoral industries have the potential to become high growth and employment sectors in the next decade. It must be noted, however, that this is highly dependent on international demand.

Capitalising on its proximity to Asian markets, non-traditional cropping and agricultural supply chain management provide the best prospects for the region.

The region’s hinterland has the potential to become a source of biofuels. Mine run-off has been employed in the arid inner Pilbara to produce small agricultural irrigation projects, including a scheme, under the Royalties for Regions program, for the planting of four acres of Moringa shrubs.³ In addition to providing food for cattle, The Department of Agriculture and Food anticipates the shrubs could be used for biodiesel, providing export opportunities and addressing energy shortages projected for 2020.

The proposed development of an abattoir in Port Hedland to serve the North West could also provide opportunities conducive to the Pilbara Cities vision.

Despite the region’s rich natural landscape and cultural heritage, tourism remains a secondary and underdeveloped contributor to the Pilbara economy. A flow on effect of increased tourist numbers is expected from the Pilbara Cities initiative, although this is likely to go beyond the 2020 scope. The Pilbara possesses the potential to become a niche destination, specialising in eco and cultural tourism.

Aviation is projected to continue to grow and to play a more significant role in the development and connectivity of the Pilbara. The region’s four air transport hubs will experience higher frequency inter- and intra-state services, based on an increasing fly-in fly-out worker, resident and tourist population.

Despite being dwarfed by the minerals and energy sector, the fisheries and aquaculture industries will continue to generate revenue, employment and provide economic diversification for the Pilbara in the next decade.

The region will continue to be a major contributor to Western Australia’s total finfish catch. Climatic variation, however, may threaten the region’s prawning industry. The Department of Fisheries has found decreased rainfall negatively impacts upon banana prawn production levels.⁴ Recreational fishing activity will rise, with an increased tourist and residential population, subsequently bolstering charter activity. It is imperative that the Department of Fishing develops a regional sustainability plan to promote sustainable yields.

Aquaculture has the potential to become a high growth industry. Private enterprise initiatives in pearl and coral production have the potential to mature, to provide differential employment and economic opportunities in the region. The state government is expected to provide grants to support the fledgling industry.

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² Minister for Resources and Energy, New Offshore Petroleum Exploration Areas Released, April 2011
³ Pilbara Development Commission, Pilbara Water Projects, May 2010
⁴ Dr J W Penn, State of the Fisheries Report 2001/2002, Department of Fisheries, Perth 2002
The promotion of effective water management practices will foster economic and residential growth in the Pilbara. The Department of Water cites demand, availability and quality as potential inhibitors to the development of the region. Demand for water currently exceeds, or is close to exceeding, long term reliable water supply in regional centres. Pressure on surface and groundwater is being further strained by a long-term drying effect, a phenomenon the CSIRO predicts will continue. Predictions of climate change remain vague and understudied.

Over the next five to ten years the West Australian Water Commission will upgrade water infrastructure. Surface water and groundwater resources will be augmented by non-traditional water sources. Increasing cost effectiveness and reduced reliance on rainfall make seawater desalination an attractive option. This has been recognised by the state government, with planning for a plant to support the west Pilbara in the final stages. Third party supply from mine run-off and water extraction from slurry pipelines remains a viable, albeit logistically difficult, option. The Department of Water, in consultation with stakeholders, produced a report in mid-2010 entitled The Pilbara Regional Water Plan 2010-2030, detailing future projects and recommendations.

The Pilbara’s population and profile are predicted to dramatically change in the next decade. The West Australian Planning Commission ambitiously seeks to create:

Culturally diverse communities living in environmentally sustainable and economically viable settlements; providing for communities that are safe, healthy and enjoyable places to live and work; and offering a wide range of quality cultural, educational and recreational opportunities.

The expansion and diversification of the regional economy will compound the Pilbara’s annual growth rate to approximately five per cent, supporting a population of 62,000 by 2020. Economic influences will broaden and deepen the demographic character of the population, with the age-gender profile reflecting national characteristics rather than current peculiarities. The challenge of providing adequate and affordable housing remains the government’s top priority.

Population growth and changes to demographics will promote the development of better civil facilities and services within the Pilbara. The development of community infrastructure will serve a dual purpose of population retention and resident attraction.

The health sector will parallel economic and demographic changes. Current recruitment and infrastructure issues will be addressed by initiatives from the Royalties for Regions program, the Department of Health, not-for-profit and government sponsored private sector expansion. Further, the Nickol Bay regional hospital upgrades are anticipated to be completed by mid-decade.

Existing social welfare issues will be mitigated in the future through expansion of drug, alcohol and mental health programs and through adopting strategies consistent with the Federal Government’s “Close the Gap” campaign.

Current educational shortcomings will be tackled through dynamic primary and secondary education schemes, support for educational professionals and continued development of facilities across all sectors, including tertiary.

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5 Pilbara Development Commission, Pilbara Water Projects, May 2010
6 Pilbara Area Consultative Committee, The Pilbara Plan: An Urgent Call to Action to Rescue the Pilbara Communities, December 2008
7 Western Australian Planning Commission, Pilbara Planning and Infrastructure Framework February 2011, p. 7
**Challenges**

The Pilbara’s population cannot expand without a variety of drivers attracting a substantial and sustainable population. Contrary to the government’s projections, forecast population growth and a more complex demographic character are far from guaranteed. Current social, economic and political deficiencies are disincentives to population growth. Paradoxically these issues will not be easily rectified without population and demographic changes.

While critical infrastructure in health, education and basic provision of services, fails to meet community expectations, large scale population growth will not occur. The current inelastic supply of housing and land encourages social polarisation within the Pilbara and makes the region undesirable for potential residents. The perceived lack of a “sense of place” and limited cultural activities must be redressed before expansion can begin. Again, ironically, population growth is required before these issues may be resolved.

The Pilbara Cities vision is inextricably linked to the resources and primary industrial sectors, the current Pilbara workforce is primarily resource sector oriented. To develop the region, a diversification of the economy and employment opportunities is required. Innovative and viable industries are needed to attract and sustain a diverse residential population.

Social and Economic policy must be complemented by Federal and State political support for the Pilbara Cities vision. The Pilbara’s continued prosperity relies upon population growth. The December 2010 announcement, that Rio Tinto will require 6000 more employees to meet its 2020 quota, highlights the need for a national population policy that includes incentives to settle in the Pilbara.

Water represents one of the most immediate challenges to future population and economic growth. The state is currently making a considerable investment in capital and operational expenditure to supply water to the region. This will translate to an increased cost to consumers. Competition for water will rise, with industry and population growth fuelling demand.

The complexity of the land rights debate has the potential to constrain future infrastructure and development projects in the Pilbara. As demonstrated by the current Yindjibarndi/FMG debate, Native Title remains a contentious issue for all stakeholders. Documents associated with Royalties for Regions have drawn a parallel between regional economic growth and Indigenous opportunity, a notion that has so far proven false.

Shortcomings in amenities and livability in the Pilbara cannot be addressed by current governance and program structures. The current silo approach fails to promote integration of policies, projects and programs. The proposed establishment of a “Pilbara Cities Office” within the Department of Regional Development and Lands will simply add another layer of bureaucracy.

As proposed by the Curtin University Sustainability Policy Institute an East Perth Redevelopment model with an autonomous government entity, would promote accountability and efficiency. Benefitting from recruiting expertise from all government departments, with an independent budget and potentially a Pilbara minister, the body would improve regional morale and confidence in the future of the Pilbara Cities vision.

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9 Peter Newman, Curtin University Sustainability Policy (CUSP) Institute; Darren Bildborough and Paul Reed, Parsons Brinckerhoff; Mike Mouritz, HASSELL, Pilbara Cities: From Projects to Places, July 2010
Conclusion

The rudimentary elements to achieve the Pilbara Cities vision already exist. Development over the next decade will strengthen the economic, social and political character of the region. It is imperative, however, that solutions to the challenges the region faces are negotiated, to avoid it becoming a quasi-gated community or a large scale Cossack.\textsuperscript{10}

Decision makers must use the expertise from local, state and federal stakeholders to ensure optimal funding and support for the Pilbara development program. The state government should consult with other created urban environments such as Milton Keynes, in the United Kingdom or the geographically comparable Masdar, in the United Arab Emirates.

\textsuperscript{10} A Pilbara ghost town abandoned in the 1950s.
KEY POINTS

- For the remainder of this decade, the minerals and energy sectors will continue to drive demand for labour in the Pilbara region of Western Australia. Projections suggest that by 2014, 26,000 skilled workers will be required for resource projects, many of which will be needed in the state’s north-west.

- By 2020, demand for skilled labour is expected to increase. Industry bodies have voiced capacity concern, with the Chamber of Commerce and Industry of Western Australia projecting a state-wide shortfall of over 200,000 workers.

- Given the economic profile of the Pilbara, and its significance to the state and national economies, challenges to production levels may result in serious fiscal constraints of future governments.

- To alleviate worker shortages a broad mandate of strategies is required from both government and commercial stakeholders.
Summary

The minerals and energy industry continues to make a significant contribution to employment and wider economic activity in the communities of regional Australia, and to governments directly through taxes and royalties. Skilled labour shortages, however, will continue to have an impact on the nation’s future growth and development prospects, especially in the minerals and energy industry. In 2013, $175 billion worth of resource projects in Western Australia are currently either underway or being considered. Many of those resource projects are located in the Pilbara region. One ongoing risk to these resource projects is the constraint on supply from skilled labour shortages. This remains a critical issue with long-term implications and direct consequences for mineral and energy projects, regional Australia and the national economy.

Analysis

Approximately 40 percent of the nation’s exports come from Western Australia, with much of it coming from the Pilbara region. Central to maintaining this position of being a premier resource state is growing a skilled workforce to maintain growth in an otherwise tight labour market. Otherwise, pressure will increase due to rising costs and potentially put at risk some projects in the resource sector.

By 2020, according to the Chamber of Commerce and Industry of Western Australia (CCIWA), the state is likely to have a shortfall of 200,000 skilled workers, with approximately 30,000 workers needed in the resources sector. A lack of skilled workers will place at risk future resource projects in Western Australia. The value of these resource projects, according to research conducted by the CCIWA, is approximately at $200 billion.

The Chamber of Minerals and Energy (CME) of Western Australia support this view of the risk posed to this sector. In their 2013 State Growth Outlook, they state that ‘the workforce required for growth plans in the minerals and energy sector in Western Australia is projected to peak at 125,000 people in 2014.’ This is significant because it requires an eight percent increase on the existing workforce. The peak year is estimated as 2014 for the current phase of construction in the minerals and energy sector, with a shift towards operations of these resource projects.

A shift from construction activity to operations will see the Pilbara region require approximately 9,000 workers in 2018, with the CME forecasting that the 23,000 works moving away from construction activity in this sector will be ‘partially offset by 14,000 additional operational workers.’ The demand for a growing skilled workforce however, still remains.

The Pilbara region of northwest Western Australia is considered ‘Australia’s most productive region’. It has many resource projects planned or underway. Three of the state’s four ‘super projects’ are located in the Pilbara: Woodside’s Pluto Liquefied Natural Gas (LNG) project near Karratha, Chevron’s Gorgon Project and Wheatstone. The fourth, Woodside’s Browse LNG development, is located further north in the Kimberley region. Despite fluctuating commodity prices, increased iron ore mining operations in the Pilbara also look set to fuel the region’s economic activity and exports.

The ongoing expansion and development in regional Australia, especially northwest Australia’s Pilbara and Kimberley regions, underlines their long-term economic significance to the national economy.

The regions’ critical infrastructure is a vital part of Australia’s current and future prosperity. It is the key growth enablers such as people, energy and water, supported by demand drivers and infrastructure that will ensure prosperity. Also, Western Australia’s proximity to Asia, abundant resources, world-class infrastructure and a strong regulatory environment are elements that serve to ameliorate the risk posed by skilled labour shortages.
The Pilbara, with a resident population base of approximately 59,896 people,¹ can be considered one of the most productive regions in the nation. It is worth noting that the Australian Bureau of Statistics do not count fly-in, fly out (FIFO) workers in such population counts.

In 2006-07, the Pilbara region delivered $7.1 billion to the Commonwealth in taxes and royalties.² It also provided 20 per cent of total national merchandise export taxes and royalties, with the value of its exports in 2007 exceeding $33 billion.

In 2011, according to the Pilbara Development Commission, the region has a gross regional product of $32.548 billion showing that despite the Global Financial Crisis (GFC), fluctuating commodity prices and labour shortages, the region continues to consolidate its economic position as one of pre-eminence to building the nation's wealth.

The Pilbara’s significance is not just the role it plays in the national economy, but its central role in Western Australia's economy and growth prospects. This highly productive region is promoted by the Shire of Roebourne, home to Karratha and Dampier, as the region that provides the state with approximately 45 per cent of its export income, 61 per cent of its gross resource output and 23 per cent of Gross State Product.

There is a growing realisation among the broader Australian community, including the southeast part of the nation, that the Pilbara region played a pivotal role during the GFC, when its exports of minerals and energy helped prevent Australia from slipping into recession.

Between 2002 and 2007, skills shortages, alongside export bottlenecks, were identified as a capacity constraint. The significance is that the shortages during that period led to Australia losing global market share in eight mineral commodities, including coal and iron ore.

There remains a risk in sourcing increasing numbers of skilled workers from intra- and inter-state, as well as internationally.

While there is a better awareness of how the national economy relies heavily on exports from the resource sectors, especially in north-western Western Australia and Queensland, than it has over the past few years, the reliance on these parts of regional Australia will continue over the medium- and long-term.

Regional Australia needs a skilled workforce. A lack of skilled workers in the Pilbara will constrain the region’s capacity to grow.

Skills Shortages

Industry, state and local governments are all pursuing policies to make the Pilbara and its key regional centres become a place of choice, where people choose to live, work and raise families. Port Hedland and Karratha, the “Pilbara Cities”, are planned as major cities of the future. Whatever the economic situation, the Pilbara must become a sustainable region that can endure tough times and capitalise on the boom periods.

The need for viable and sustainable communities in the Pilbara region is not just in the interests of Western Australia, but also in the national interest.

¹ The Pilbara Development Commission, 2013
² The Shire of Roebourne, Western Australia, 2010
As Andrew Forrest from the Fortescue Metals Group said back in 2008, citing his confidence and concern for the Pilbara:

The Pilbara is not a short term quarry. It will sustain major wealth generation for Australia for hundreds of years. The Pilbara therefore can and must host long term, fully sustainable and high quality living Pilbara communities.³

As the region becomes economically more important to the nation, there will be a greater need to tackle core problems, which may place a brake on future growth. Labour and skill shortages are an important element that must be addressed to ensure the region’s future growth and development. One immediate implication of labour shortages is the upward pressure placed on labour costs.

Even prior to the GFC, a major constraint on growth was the availability of labour and a skilled workforce. In the post-GFC environment, the CME has identified that over the long-term, it is limits on the so-called “growth enablers”, that will continue to have an adverse impact on the ability of the Pilbara to capitalise on future growth.

The Chamber of Minerals & Energy (CME) states that ‘skilled labour demand remains a critical issue’. Strategic initiatives have been suggested by the CME to address this issue. Increased demand in the minerals and energy sector requires more highly qualified professionals and technical staff. The CME advocates ‘an increased commitment to education and training’ and ‘continued support for the skilled migration scheme’. Also, The Chamber of Commercial Industry (CCI) have skilled migration and international trade teams which recruit skilled workers from overseas and assist them with their visa processing. CCI, who work with Apprenticeships Australia, have an Apprenticeships Solutions team as part of a way with developing a skilled workforce. In addition, trade unions also participate in training and supplying local skilled workers.

Such measures provide industry with the required number of suitably qualified people to work on resource projects. Peak employer and union bodies agree that skilled workers are also required in other industries, such as the construction and housing sectors, though differ on where these workers should be sourced.

The Pilbara Region and Employment Projections to 2020

Ongoing demand in the minerals and energy sector will continue to create labour shortages in Australia, especially the Pilbara region. This will see workforce shortages compounded by increasing demand in a variety of occupational categories, such as engineering and geoscience. Minerals and energy companies expect that in regards to workforce demand through to 2020, the period of highest demand across Western Australia would be 2008-2014.

In particular, this demand for labour in the Pilbara region has its implications. To attract and retain workers companies will have to face competition from other regions across Western Australia, who will also be seeking more minerals and energy workers. Competition will also be for a highly mobile international workforce and will be difficult given that prospective employees will have many options to be employed at any number of resource hubs around the globe.

The unevenness of demand for labour and skills across sectors, including the minerals and energy sector, will create gaps and lags across various occupations and skills. This is especially likely to occur during the construction phases of projects in the Pilbara region, and their shift to operations. The Pilbara Industry’s Community Council report of April 2010 stated that ‘the projected construction activity generates construction employment reaching over 22,000 in 2010’. Nearly all those additional workers were FIFO, depending on the location of the project.

³ The Pilbara Plan 2008
The Australian Government’s Resourcing the Future: National Resources Sector Employment Taskforce Report released in July 2010 found ‘there is significant potential for skills gaps to emerge between 2011 and 2013 as construction of new resources projects commences.’ The peak in demand is likely to occur by the end of 2013 because of the anticipated peak in construction of major infrastructure projects. It is recognised that even as the sector shifts towards operations, skilled labour shortages will remain.

The reliance on FIFO will have an impact on regional communities, especially if the workers are flown in from regions well outside those where mineral and energy operations are conducted. Confidence in the long-term viability of the Pilbara region and, over time, potentially the “Pilbara Cities”, could wane if an outside workforce is flown in and out to conduct lucrative work, at the expense of locals and others willing to consider living permanently in the north-west of Australia.

Much of the wealth created by FIFO workers in the Pilbara is not spent where it is earned. In 2010, the Commonwealth Bank of Australia Economic Utility Report indicated that many FIFO workers who earn their money in the Pilbara spend it elsewhere. Local government authorities (LGA) in the Pilbara understand that mining companies use FIFO for economic reasons on their resource projects. Many LGAs, however, claim that FIFO arrangements undermine the long-term viability of developing sustainable communities in regional Australia.

More recently, the House of Representatives Standing Committee on Regional Australia released its 2013 report of the Cancer of the Bush or Salvation for our Cities? Fly-in, fly-out workforce practices in regional Australia. The report’s 21 recommendations seek to address the impact FIFO is having on regional Australia. It found that for many companies and peak organisations, ‘the shortage of labour, particularly skilled and experienced labour, is a common justification for the use of FIFO workforce arrangements.’

(Figure 1) Regional Perspectives of Pilbara Population Growth, 2015 & 2020

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<tbody>
<tr>
<td>Dampier/Karratha/ Burrup-Roebourne</td>
<td>23,424 (81.3%)</td>
<td>3,800 (13.2%)</td>
<td>1,591 (5.5%)</td>
<td>25,002 (89.2%)</td>
<td>1,300 (4.6%)</td>
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<td>Port Hedland</td>
<td>19,012 (90.3%)</td>
<td>1,000 (4.7%)</td>
<td>1,050 (5.0%)</td>
<td>19,870 (94.7%)</td>
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<td>Onslow</td>
<td>2,360 (6.1%)</td>
<td>1,500 (38.9%)</td>
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<td>2,360 (100%)</td>
<td>n/a</td>
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<tr>
<td>Newman</td>
<td>8286 (89.4%)</td>
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<td>980 (10.6%)</td>
<td>8,286 (89.4%)</td>
<td>n/a</td>
<td>980 (10.6%)</td>
</tr>
<tr>
<td>Rest of East Pilbara</td>
<td>535 (3.3%)</td>
<td>81 (0.5%)</td>
<td>15,784 (92.6%)</td>
<td>535 (2.6%)</td>
<td>400 (2.0%)</td>
<td>19,556 (95.4%)</td>
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<tr>
<td>Ashburton (excluding Onslow)</td>
<td>7,468 (41.1%)</td>
<td>2,581 (14.2%)</td>
<td>8,119 (44.7%)</td>
<td>6,456 (37.5%)</td>
<td>400 (2.4%)</td>
<td>10,348 (60.1%)</td>
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</table>

Source: Planning for Resources Growth in the Pilbara: Revised employment & population projections to 2020 for Pilbara Industry’s Community Council, April 2010
To alleviate some of the issues caused by workforce shortages some major resource companies are employing new technologies to manage operations remotely. Many of these firms also rely on FIFO rosters. According to Mike Waller from Heuris Partners Ltd, ‘the strongest projected employment growth is in FIFO: current projections in 2015 and 2020 are some 10,300 and 16,000 higher than the July 2008 projections’. The continuing reliance by firms on FIFO, expressed as a percentage, is expected to increase by 83 per cent between 2010 and 2015. This will increase a further 23 per cent from 2015 to 2020. By 2015 some 90 per cent of the FIFO population will be involved in the iron ore industry.

Over the long-term, FIFO arrangements may become unsustainable. If a large proportion of a company’s workforce remains organised around FIFO rosters, it will be exposed to risks such as the impact of future increases in the cost of fuel and possible disruptions to fuel supplies, which in turn will have an impact on the commercial viability of regional airlines and air charter companies. To avoid this future scenario, exacerbated most likely by “peak oil” conditions, it is necessary to look at options that create and support regional workforces that live close to where there is demand for their labour.

As the shift moves from construction to operations however, the operational workforce employed in minerals and energy may also see a shift towards residential workforces. According to the CME and its 2013 State Growth Outlook however, ‘indications are that FIFO will remain in excess of 50 percent of the workforce.’ It recognises though that ‘the development of social infrastructure will be pivotal to improve the liveability of regional areas to attract and retain skilled residential workforces.’ Therefore, issues such as the availability of land for development, a supply of new and affordable housing, social infrastructure and water security are important elements in providing hubs for locally-sourced workers.

**Confronting constraints to economic capacity**

Increasing Indigenous participation and employment in the resource sector is just one element in addressing that situation. Many minerals and energy projects have dedicated Indigenous training and employment to assist Indigenous people become part of their workforce. The minerals industry claims to be the largest private sector employer of Indigenous people, with five per cent of its direct workforce identifying as being Indigenous Australian. As the mining, resource and energy sector grows, it will continue to play an important role in the employment of Indigenous Australians, especially those living in regions such as the Pilbara.

Another element is the dedicated creation of regional workforce plans. They could focus on the specific needs of a particular region, factoring in the particular geographic and workforce requirements, and coordinate a response across government to provide assistance to industry and the local community. Greater engagement by government with industry stakeholders will better inform workforce training and employment. Skills development is a shared responsibility between Commonwealth, State and Territory Governments.

The Minerals Council of Australia, Chamber of Minerals and Energy Western Australia and Queensland Resources Council, in a joint submission on skills to the Australian Government, stated that ‘most operations in remote and regional locations prefer local workers and are committed to increased employment of local Indigenous people who can meet their employability requirements’. The challenge for this sector, however, is that many Indigenous people located in these areas experience ‘low levels of literacy, numeracy and fitness for work attributes, which precludes them from taking up training opportunities’.

The Australian Institute of Mining and Metallurgy (AusIMM) is another key stakeholder in regional Australia that has informed the government about what it views as constraints on the supply of skilled workers. Representing minerals sector professionals, AusIMM claims that supply constraints can be addressed immediately by adding a host of jobs for mining professionals to the Skilled Occupations List. Other issues addressed include taxation reform, improving funding to universities, creation of courses for industry outcomes, as well as dedicated geotechnical engineering training at the undergraduate level.
AusIMM also argues that there is an urgent need to address the lack of women working in the industry. Suggestions include closing the gender pay gap, improving workplace cultures within the resource sector, and making ‘childcare expenses in rural and regional Australia tax deductible’.

Another element for consideration is Australia’s ageing society and its consequent transition effects on the workforce over the next decade. The demographic impact of such a shift in the median age and availability of skilled workers in the minerals and energy sector could see an increasing proportion of the workforce scaling-back their total number of hours worked per week, or leaving the workforce altogether through retirement or semi-retirement.

At present, the majority of employees in the minerals and energy sector work full-time and are predominately male with a median age of 40 years, compared with a median age of 37 for all industries in Australia. The shift towards an ageing labour force and smaller skilled workforce in selected occupations and sectors could mean a decline in relative productivity, impacting on economic growth.

Skilled migration, sustainable population and providing employment opportunities for Indigenous Australians are just three elements that must be considered when addressing existing and future skill shortages.

Numerous government and peak body taskforces are all too well aware of the strategic importance of the need for a skilled workforce, both now and into the future. Many more skilled workers will be needed across the nation over the next decade, particularly on resource projects across regional Australia.

Therefore, strategic initiatives and policies must continue to be implemented by government to provide the right training, employment and investment conditions for the natural resources sector. Continued and improved engagement by government with industry and the community is essential.

The long-term viability of resource projects in the regional Australia, particularly the Pilbara region, is dependent on a ready supply of skilled workers to enable the economic advantages such developments bring to the nation.

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Bulk carrier and floating crane in port at twilight. Port Hedland Western Australia
Expansion of Pilbara Ports to Power Region’s Economy

Gavin Briggs
Research Manager, Northern Australia & Energy Security Research Programmes

KEY POINTS

• Maritime logistics are a vital consideration for the Pilbara’s economy. As production levels continue to grow, capacity of regional ports are under increasing pressure. Major operators are developing strategies to increase capacity, and will be complemented by State Government initiatives, such as the Anketell facility.

• Cyclonic activity and extreme weather conditions will continue to be a major influence in commercial maritime activity.

• Industry has developed synergies with local research bodies in an attempt to mitigate threats to operations and develop more rigorous responses to cyclonic behaviour.
Summary

The ongoing strategic importance of the Pilbara region's ports is highlighted by announcements made throughout 2010 by major resource companies on the expansion and improvement of their export capacity. North West Australia’s climatic conditions and sometimes extreme weather events, such as the annual incidence of tropical cyclones, provide elements of risk for the development and operation of projects in the region. This does not, however, prevent investment in offshore and onshore projects, as companies operate with stringent mitigation strategies for their staff and assets. Despite the region’s geography, climate and severe weather events, the Pilbara continues to enjoy high levels of investment, expansion and economic growth. With this activity fuelled by the ongoing and increasing demand for minerals and energy, the Pilbara will remain pivotal to Australia’s and Western Australia’s economies.

Analysis

Importance of Pilbara Exports

The Pilbara’s iron ore and Liquefied Natural Gas (LNG) are two of Western Australia’s largest export earners. Yet, while the mineral and energy sectors provide many economic opportunities, the state government and industry are all too aware that the current capacity of the Pilbara ports limits future growth, especially for the iron ore and other mineral sectors.

In early 2010, the Western Australian Government unveiled plans to construct a new Pilbara deepwater port to meet ongoing and increasing demand for the region’s iron ore. On 4 March 2010, Premier Colin Barnett announced that Anketell had been chosen ‘as the next major deepwater iron ore port for the Pilbara’.

Located 30 kilometres east of Karratha and 10 kilometres from Cape Lambert, Anketell will complement the other Pilbara ports at Port Hedland and Dampier. Slated to be operational by 2015, this new deepwater port will have an export capacity in excess of 350 million tonnes per annum (Mtpa). It will include new transport corridors and an adjoining 1,400 hectare industrial precinct.

This decision has been driven largely by the need to increase the export capacity of the Pilbara ports and to capitalise on the ongoing demand from East Asian markets.

In 2008-09, bulk commodity exports from the Pilbara ports - predominantly iron ore - amounted to 326 Mtpa. That amount will continue to rise. By 2015, it is forecast to reach 530 Mtpa, and by 2020 750 Mtpa.

Iron ore is the most valuable resource sector in Western Australia. According to the Western Australian Department of Mines and Petroleum, the value of the state’s iron ore industry grew in value by 53 percent during 2008-09 to $33.56 billion and in volume by 8.5 percent to 316 million tonnes.¹

Iron ore currently accounts for 47 percent of the total value of Western Australia’s resources. The state Government stated that, in 2008-09, China was the number one export destination for Western Australian iron ore (64 percent) followed by Japan (21 percent) and South Korea (10 percent). An additional three percent of the state’s iron ore is exported to Taiwan. This means East Asia represents approximately 98 percent of Western Australia’s iron ore export market.

The Players

The major iron producers based in the Pilbara region are BHP Billiton and Rio Tinto. In 2008-09, these two companies accounted for approximately 90 percent of Western Australia's iron ore production.

BHP Billiton is one of the acknowledged long-term iron ore 'majors' operating in the Pilbara, and employs 8,000 people in its Pilbara operations, or approximately 18 percent of the region's population. Its business operations include seven mines, a rail network of nearly 1,400 kilometres and two separate port facilities. These are located on opposite sides of Port Hedland's harbour, one on Finucane Island and the other, where its ship-loader is based, on Nelson Point. The iron ore shipment systems are designed to load four 160,000 tonne vessels at the same time.

Another Pilbara ‘mining major’ is Rio Tinto Iron Ore, which operates three shipping terminals at two ports in the Pilbara, exporting iron ore to markets in East Asia and Europe. One port is located at Cape Lambert some 40 kilometres north north-east of Karratha. The other is at Dampier on the Burrup Peninsula, with two shipping terminals: Point Parker and East Island Intercourse.

Rio Tinto Iron Ore announced on 24 September 2010 ‘Dampier Port expansion works that will result in an additional five million tonnes annual capacity (Mtpa), taking total Pilbara annual capacity to 230 Mtpa in Q1 2012.’

Only last month, on 21 October 2010, Rio Tinto Iron Ore announced that Robe River Iron Associates (53 per cent Rio Tinto) shipped its one billionth tonne of iron ore from the Pilbara.

Fortescue has emerged as the region’s ‘third player’ in the export of iron ore. A US$8.4 billion announcement by Fortescue on 19 November 2010 outlined a proposal to expand its Pilbara iron ore operations. This includes the expansion of its existing iron ore mining operations at Cloudbreak and Christmas Creek, located at the Chichester Hub, and opening up new mines at its Solomon Hub.

‘To achieve the expansion timetable, Fortescue will spend capital of US$8.4bn over a planned 30 months, which at the peak of construction will equate to approximately US$26m per day,’ said Fortescue Metal Group (FMG) Development Director, Peter Meurs.

A Fortescue company statement said that its company will lift its iron ore production from 55 Mtpa in 2009-10 to 155 Mtpa by 2013. The improvement and expansion of its port and rail facilities will be at a cost of US$4.6 billion.

Fortescue currently has two berths and a single load-in and load-out circuit at the port. The Port Hedland Port Authority (PHPA) has given priority for the company to export 120 Mtpa. This recent announcement will see the construction two additional load-in and load-out circuits. PHPA has also provided capacity for Fortescue to construct two more berths, while the company has expressed its interest in securing a fifth berth. Upon completion of the expansion, it will have the capacity to export 155 Mtpa.

The rate of development of Fortescue's port capabilities has been impressive. Its open-access Herb Elliott Port at Point Anderson, Port Hedland, sits on a two million square metre site of reclaimed land. At this particular development the first earthworks commenced in February 2006 and by October 2009, the company had loaded 40 million tonnes of iron ore.

These developments round off a year in which the Pilbara attracted major investment decisions by government and the major iron ore companies. Much of the focus of these announcements has been on strategic infrastructure expansions, including transport corridors and hubs, such as the ports.
Port Hedland

In September 2010, World Port Development stated that Port Hedland ‘is the second largest tonnage port in Australia, the largest iron ore port in the world and the largest bulk mineral exporting port in the world’. As a bulk commodity performer, Port Hedland is Australia’s largest tonnage port, and second only to China’s Port of Qinhuangdao.

According to strategic forecasts by the Town of Port Hedland in 2010, the port is on course to becoming ‘the world’s largest tonnage port on the back of the escalating production of iron ore’. The Town of Port Hedland also forecast that the PHPA will experience a growth rate of 600 percent over the long-term.

On 5 July 2010, PHPA chief executive officer Andre Bush announced that the port had broken its export tonnage record for a financial year. The expanding harbour had seen a throughput of 178.6 million tonnes during 2009-10, up by 20 million tonnes on the previous financial year.

‘The full development of the inner harbour in the coming years could well see trade levels exceed 400MT a year. In the near term we are projecting total trade to exceed 200 million tonnes for the coming 2010-11 financial year and to be over 300 million tonnes for the following year 2011-12,’ Andre Bush said.

With new iron ore discoveries still being made across the Pilbara, especially in East Pilbara, developers are able to take advantage of existing rail lines. Discussions continue regarding access to rail lines owned by the major iron ore developers. An increase in the export of iron ore from this region will naturally increase the throughput at PHPA. Expansions are underway at the port to ensure that this growth can be accommodated.

Over the next decade, PHPA will undertake major expansion of its operations. ‘Plans are progressing for the development of an additional 11 berths in the Inner Harbour over the next five years which should bring the total Inner Harbour throughput to around 470 Mtpa. Development plans for a 400 Mtpa Port Hedland Outer Harbour off Finucane Island to cater for proponent needs beyond 2014 are advancing,’ Andre Bush said.

In October 2010, the Town of Port Hedland released a strategic document titled Hedland’s Future Today. In it, the Town claims that, by 2018, it seeks to have ‘co-location of naval defence facilities within the inner harbour, including a refuelling station’. Such forward planning means that this harbour will have port facilities that can accommodate both future commercial and defence requirements.

Dampier

The other major Pilbara port is Dampier, which is ranked third globally by World Port Development. Demand for iron ore (approximately 83.2 percent) and gas (approximately 15 percent for its LNG, liquefied petroleum gas and condensate) drove the bulk of the 2008-09 record annual tonnage of 140 Mtpa for the Dampier Port Authority (DPA).

The DPA states that the port, located just west of Karratha on the Burrup Peninsula, is 1,260 kilometres north of Perth. The port is a vital link in a logistics network that extends 350 kilometres inland to the iron ore mines and 200 kilometres seaward to the oil and gas fields of the North West Shelf.

The DPA’s 2010 Annual Report outlines the port’s capabilities, which include the operation of ‘the Dampier Cargo Wharf (DCW) and the Dampier Bulk Liquids Berth. The DCW provides up to seven berths, and supplies water and fuel to the vessels servicing the marine industry, offshore oil and gas facilities. The DPA’s facilities consist of the wharf, a heavy load-out facility, an alternate load-out facility and a barge ramp.’ The demand for the latter facility over the last year ‘has increased significantly’ and ‘further berth capacity is currently under design’.
In the year ending 30 June 2010, Dampier port entered a tonnage record 170.7 Mtpa and a record 4657 vessel arrivals. Looking at the future prospects for Dampier’s port, DPA Chairman Brendan Hammond said that ‘in particular, the Board has confirmed the importance and benefit of expanding the boundaries of the port’s expertise and experience, to take account of proposed port developments near Onslow (Ashburton North) and Point Samson (Anketell Port/SIA)’.

**Cyclones and their impacts**

An ongoing influence in this region is its climatic patterns and extreme weather conditions. One defining element is the presence of tropical cyclones that form offshore and regularly, cross the Pilbara coastline in the cyclone season.

The region along Western Australia’s north-west coast, between Exmouth on the North West Cape and north to Broome, is, according to the Bureau of Meteorology (BOM), ‘the most cyclone-prone part of Australia’s coastline.’

Most of Western Australia’s offshore oil and gas industry is located in this region and is regularly subjected to severe weather conditions, such as cyclones. With many energy developments situated in waters near the coast and offshore along the state’s north-west coastline, tropical cyclones present a particular hazard for this industry sector. Australia’s cyclone season is from November to April, though few have occurred in November. The Bureau of Meteorology (BOM) states that further west, however, in the Indian Ocean, ‘cyclones can occur all year around although the risk of one in the winter months is very low’.

Tropical cyclones are defined by the Bureau of Meteorology (BOM) as ‘low pressure systems that form over warm tropical waters and have well defined wind circulations of at least gale force strength (sustained winds of 63 kilometres per hour or greater, with gusts in excess of 90 kilometres per hour).’

The Pilbara region is also the most prone to severe cyclone impacts. According to BOM, ‘seventy-two of a total of 146 coastal crossings in Australia between 1970-71 and 2003-04 were in WA’. Also, ‘thirty-four of the total forty-two severe cyclone crossings occurred in WA. Most of these occurred between Broome and Exmouth.’ This means that, on average, WA has 2.2 cyclone crossings per year, one of which, again on average, is considered severe. (Figure 1)

(Figure 1) Average Annual Number of Tropical Cyclones (1969/70 – 2005/06)

Source: Bureau of Meteorology
Several severe tropical cyclones (TC) have hit the Pilbara Coast over the last decade. Two of the more recent ones that crossed the Pilbara coast line last year were: category five TC Paul on 21 December 2009 and category two TC Dominic on 27 January 2009. The latter cyclone crossed just 12 kilometres east of Onslow.

During the period 3-10 March 2007, TC George was one of the most destructive recent cyclones to have an impact on Port Hedland. Not since TC Joan in 1975 had the region suffered such a severe storm. It crossed the Pilbara coast 50 kilometres northeast of Port Hedland on 8 March 2007 and the BOM records that TC George was responsible for ‘three fatalities and numerous injuries at locations south of Port Hedland’. However, ‘less than two percent of buildings in the greater Port Hedland area (i.e. including South Hedland) sustained structural damage’.

According to PHPA in its 2008-09 Annual Report, ‘due to effective management, minimal disruptions were experienced due to the passage of tropical cyclones off the coast this past season, with a total of just 37 hours lost to port closure from 1 July 2008 to 30 June 2009.’

Cyclone Research

At present, there is a lack of depth in the information available about the risk posed by the impacts of cyclones. This is especially true for new projects like those in regions like the Pilbara and further north in the offshore Kimberley region, such as the Browse Basin. There is a similar problem in the Carnarvon Basin, which includes Gorgon on Barrow Island, and a host of other onshore and offshore oil and gas developments. Due to their location, they are periodically subjected to weather extremes such as cyclones. Offshore gas basins across North West Australia and, in particular, North West Western Australia, are shown in Figure 2, illustrating the regions which can be affected by tropical cyclone activity.

(Figure 2) North West Australia’s Gas Province: Offshore & Marginal Basins

Source: GeoScience Australia

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2 The Bureau of Meteorology defines a Category Five cyclone as: ‘Extremely dangerous with widespread destruction. A Category 5 cyclone’s strongest winds are VERY DESTRUCTIVE winds with typical gusts over open flat land of more than 280 km/h.’
One project that is investigating and assessing the impact of cyclones on the oil and gas sector is one between the University of Western Australia’s (UWA) Oceans Institute and Perth-based energy company Woodside. During the fourth quarter of 2010 they were awarded a three-year Australian Research Council (ARC) grant. The grant has been described by UWA as an opportunity to collaborate on ways for ‘predicting the ocean’s response to tropical cyclones, leading to improvements in the way the oil and gas industry designs and operates current and future offshore projects.’

‘The project will make direct measurements in the ocean and use this to develop numerical models to describe the intense stirring of the shelf waters caused by cyclones moving over the shelf,’ Professor Ivey from University of Western Australia (UWA) said.

‘The work will lead to a paradigm shift for the offshore oil and gas industry in developing their response to the hazards imposed by tropical cyclones.’

In an interview with ABC Online on 10 November 2010, Professor Greg Ivey said ‘there’s a lot of engineering infrastructure associated with the oil and gas activities offshore and what we’re really trying to understand is just what is the impact on the ocean caused by these cyclones.’

Professor Ivey added: ‘The concern is that there are new developments going on all the time in ever-deeper waters, and certainly further north up into the Browse Basin area. It’s in these new areas that we’d really like to be able to essentially forecast what the impact of the cyclones is going to be.’

The research to be conducted between UWA and Woodside will not only be developing better responses to cyclonic behaviour, it will also provide for safer oil and gas platforms. The research will involve placing instruments in the path of moving cyclones to measure what level of disturbance they create.

**Conclusion**

The Pilbara ports continue to increase their central role in exporting iron ore shipments to markets across the globe. Increasing the capacity of the Pilbara ports and constructing new sites, will meet greater export demands for minerals and energy, especially for iron ore and LNG. Ongoing investment decisions by the major mineral and energy companies, especially the iron ore producers, such as BHP Billiton, Rio Tinto Iron Ore and Fortescue, have demonstrated their combined confidence in their commodity and continued market demand; their projects will contribute strongly to the region’s long-term economic growth, no matter what the weather brings.

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The ports at Port Hedland and Dampier are the ‘two highest export tonnage ports in Australia’. Alongside Cape Lambert and Onslow, and the soon to be constructed deep-water port at Anketell near Karratha, these ports have the task of meeting the growing level of demand from existing and additional resource developments.

The capacity of the Pilbara’s ports is vital as they can be seen as ‘gateways to the global market’. When considering that 99.5 per cent of Australia’s trade by volume is carried by sea, the ongoing security and protection of these ports, and their sea lines of communication, are issues of national significance.

As the Australian Shipowners Association state, ‘mining operations, oil and gas operations and mining support activities – all rely on ships/vessels that employ seafaring skills in various ways and to varying degrees’.

*This paper is a revised and expanded version of the original paper which was first published by FDI, 25 November 2010*
KEY POINTS

• Economic, political and social projections will result in the Pilbara becoming an increasingly valuable part of Australia’s economy. Closely related to these developments, the region’s offshore assets and SLOCs will grow in strategic importance.

• Such developments create vulnerabilities, resulting in an array of risks and potential threats. Conventional and non-conventional security challenges may disrupt the region’s economy, having broad state, national and international ramifications.

• Accordingly, the Pilbara’s status must be elevated in the considerations of security and disaster response stakeholders.
Summary

The Pilbara region is considered ‘the engine room of the Australian economy’. This region produces approximately twenty percent of Australia’s exports. According to Regional Development Australia, this is ‘made possible by 0.2 percent of the national population’. Onshore and offshore resource projects, such as Gorgon, Wheatstone and Pluto, continue unabated. The North West Shelf continues to be of national significance to the Australian economy. Numerous mineral and energy projects operate across the Pilbara and exports reach global markets via the maritime gateways at Port Hedland, Dampier and Cape Lambert. Australia’s minerals, energy and other commodities are shipped along Sea Lines of Communication (SLOC) across the Indian and Pacific Oceans, and through the Philippine and South China Seas.

By 2020, the Pilbara region will increasingly become a significantly valuable part of the nation’s economy. With its offshore assets and SLOCs, it will also gain increasing strategic importance. Over the next decade, the Indian Ocean region’s security environment will continue to evolve and require Australia to address a growing strategic risk to its onshore and offshore assets across regional areas, especially the Pilbara. Factors may challenge the current order, such as major powers jostling to maintain their need for energy security and to protect their supply lines. Australia’s decision makers, therefore, need to consider increasingly a range of factors when considering the strategic defence and security requirements of the Pilbara region.

Analysis

The Pilbara region covers approximately 507,896 square kilometres (including offshore islands), which represents nearly twenty percent of Western Australia’s landmass. The region stretches geographically from the Indian Ocean in the west and eastward to the Northern Territory. The Pilbara’s offshore region includes Barrow Island and numerous energy installations along the North West Shelf.

The population base of the region is 45,983, from a State total of 2.286 million. Most of the population lives in towns in the western third of this region. There are four local government authorities across this region: Town of Port Hedland, Shire of Roebourne, Shire of Ashburton and the Shire of East Pilbara. There are major towns along the coast, such as South Hedland and Karratha, as well as inland towns such as Newman, Paraburdoo and Tom Price. These five towns represent 70 percent of the Pilbara population. The remainder of the population live in Indigenous communities, smaller towns and in remote mining and pastoral locations.

The Pilbara is one of the most productive regions in Australia. In 2006-07, the Pilbara region accounted for $26.4 billion of total output. The region also accounted for 61 percent of Western Australia’s Gross Resource Production and 23 percent of Gross State Product. According to the Department of Foreign Affairs and Trade, in 2008 this represented almost 20 percent of Australia’s total value of merchandise exports.

Some of Western Australia’s largest minerals and energy projects, such as Gorgon, Wheatstone and Pluto, are located in the Pilbara region. (Appendix A)

In September 2010, the Western Australian Departments of State Development and Mines and Petroleum stated that ‘more than $150 billion worth of projects are either committed or under consideration for the State during the next few years’.

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1 Regional Development Australia, Preliminary Pilbara Regional Plan, August 2010, p. 30.
2 Western Australian Department of Regional Development and Lands, 2010.
4 Shire of Roebourne, 2010.
In Regional Development Australia’s *Pilbara Regional Plan*, it notes that ‘$90 billion of the State’s record $112 billion of under construction or committed projects are in the Pilbara’.\(^5\)

The region’s ports, such as Port Hedland, Dampier and Cape Lambert, are most likely to remain of significant economic and strategic importance in the long-term. Ongoing investment in infrastructure, such as ports and wharves by major resource companies, continues to increase the export capacity of the region.

At present, the Pilbara regional workforce is 26,389.\(^6\) One challenge facing the region is the ongoing need for skilled labour. According to the Chamber of Commerce and Industry (Western Australia), the state is going to have a shortfall of 210,000 workers by 2020. For the Pilbara in 2020, it is projected that there will be a labour shortfall of 10,000 workers. This situation poses a significant risk to the commercial viability of resource projects in the State, especially those in the Pilbara region.

The fly-in fly-out (FIFO) workforce component in the Pilbara is seen as a solution to skilled labour shortfalls, especially during the construction phase of a project. Critics of FIFO, however, claim that it does not encourage people to settle in regional towns, allowing economic advantages to be gained from a local and affluent workforce. An estimate by the Pilbara Industry Community Council (PICC) ‘puts the regional employment growth rate at 28 percent between 2010 and 2015. And notwithstanding this growth in resident workforces, the PICC also estimates that FIFO employment will increase by 83 percent over the same period, and by a further 23 percent to 2020’.\(^7\)

Land use, rental accommodation and housing affordability and availability is one element being addressed to foster the creation of sustainable communities. The State Government’s ‘Pilbara Cities’ plan is a key component to providing large-scale population bases in the region’s northern centres of Karratha and Port Hedland. One element of the housing issue is that the development of larger and more a permanent population base will allow companies to employ more local skilled labour. According to the State Government’s ‘Karratha: City of the North’ programme, the city seeks to grow from approximately 18,000 to a city in excess of 50,000 residents.

Water is another vital element to the sustainable growth of the region and its communities. The Western Australian State Government announced on the 25 October 2010 the construction of a sea-water desalination plant in the Pilbara that will provide an additional six billion litres of water from 2013 ‘to support residential and small commercial growth in Karratha, Dampier, Roebourne, Wickham and Port Samson’.\(^8\)

Increased government funding invested in the region, such as that provided by the state government through its Royalties for Regions programme, or commercial undertakings and investment by mineral and energy companies such as BHP Billiton, Rio Tinto, Woodside, Chevron, highlight the value and potential of the Pilbara region. Whether onshore or offshore, stakeholders, both government and private, are demonstrating a willingness to invest in this strategically important part of regional Australia.

**Defence’s Role in Managing Strategic Risk and North West Australia**

Geo-strategically, Australia currently enjoys the status of being one of the world’s most secure nations. The states in our regional neighbourhood do not pose a threat to Australia’s sovereignty over the coming next decade.

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5 Regional Development Australia, Preliminary Pilbara Regional Plan, August 2010, p. 5.
7 Regional Development Australia, p. 6.
The 2009 Defence White Paper, *Defending Australia in the Asia Pacific Century: Force 2030*, (referred hereafter as *Defence White Paper*), however, acknowledged that ‘new security risks that might arise from the potential impact of climate change and resource security issues, involving future tensions over the supply of energy, food and water’.

Considerable focus of the Defence White Paper and the strategic environment to 2030 is centred on the Asia-Pacific region. It is the Indian Ocean region, however, that is likely to gain increasing geo-political significance in the coming decade. Presently, the majority of the Australian Government’s listed terrorist organisations, and current Australian Defence Force (ADF) operations, are located in the Indian Ocean region. Such an evolving security environment may, over the long-term, have an impact on the surrounding SLOCs and regions which face the Indian Ocean, such as the Pilbara.

Located on the shores of the North East quadrant of Indian Ocean region, and close to major SLOCs that carry commodities and energy to global markets, the Pilbara region by 2020 is likely to gain greater geopolitical and economic significance. Continued mineral and energy projects, both onshore and offshore, already demonstrate the region’s ongoing and long-term economic value, both to the state and the nation.

The Defence White Paper is clear that the “primary obligation” of the ADF is to ‘deter and defeat attacks on Australia’. Accordingly, the “brief” of the ADF and its primary role will remain the protection of Australia’s territory, citizens and sovereign interests from threats and armed aggression. Fundamental to this position, therefore, ‘How to balance competing national priorities is central to the Government’s decision about the future defence needs of the nation?’ and is in the words of the Defence White Paper, ‘how much strategic risk Australia is prepared to bear, and hence, how much military power we should seek to develop’.

The Australian Government is aware of the vast array of challenges it may face in the long-term, and needs to develop a host of contingencies and provide platforms that will best address strategic risk.

This broad “standing order” includes the protection of Australia’s energy supply and trade routes, domestic energy and mineral sources, both onshore and offshore. A host of critical infrastructure located across North West Australia, especially in the Pilbara region, and increasingly the Kimberley region, is set to only increase in number and value.

The vital economic assets and critical infrastructure across the North West Shelf are increasingly a case for greater focus on defence and security of the Pilbara region over the long-term and its broader strategic maritime environment.

The ADF presence in the North West Australia in 2010 includes the Army’s Pilbara Regiment, an Army Reserve unit headquartered in Karratha, Western Australia. The Pilbara Regiment also has squadrons located at Port Hedland and Exmouth. This unit is responsible for an area that covers Shark Bay in the south to Broome in the Kimberley region.

In addition, the Kimberley Squadron of the North West Mobile Force (NORFORCE) is the western most surveillance unit that is ‘responsible for land and water operations throughout the Kimberley, its coastal fringes and offshore islands’. Further north, the Kimberley Squadron Headquarters is located in Broome and has depots in Kununurra and Derby. The Army’s Force Command states that these units have ‘Intelligence Surveillance, Target Acquisition and Reconnaissance (ISTAR) capability throughout the Kimberley region’. Army also has a training centre at Yampi, near Derby.

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10 Ibid, p. 58.
There are two Royal Australian Air Force (RAAF) “bare bases” in Western Australia, both outside the Pilbara region. One is situated at RAAF Base Learmonth on the North West Cape, though when activated, is close enough to conduct operations over the North West Shelf. The second regional bare base is at RAAF Base Curtin, near Derby.

Domestic ports, such as Dampier, can be accessed by the Royal Australian Navy for refuelling. Port Hedland, however, is unlikely to be on the plans as a future naval facility. This is due not only to current fiscal restraints but increased commercial activity that continues to take place at the port.

**Critical Infrastructure Protection**

Australia’s National Terrorism Public Alert System currently remains at “Medium”. North West Australia’s onshore and offshore critical infrastructure could, over time, become over time a target of choice by non-state actors, such as terrorist organisations, or even single issue, lone extremists.

Australia remains a net energy exporter, principally of coal, liquefied natural gas, and uranium, but faces the challenge of securing external sources of energy for domestic consumption needs and their supply lines as well as the protection of critical infrastructure.

The relationship energy security has with defence and economic policy results in a number of considerations for policymakers, especially when dealing with Australian and Western Australian energy infrastructure. The Australian Government may in time need to consider a greater role for Defence in regards to critical infrastructure protection across regional Australia, especially the Pilbara region, and more broadly, North West Australia. A case in point is the increasing economic importance of the Pilbara’s North West Shelf.

The Australian Government defines critical infrastructure as ‘those physical facilities, supply chains, information technologies and communication networks which, if destroyed, degraded or rendered unavailable for an extended period, would adversely impact on the social or economic well-being of the nation or affect Australia’s ability to ensure national security’.  

Approximately 90 percent of Australia’s critical infrastructure is privately owned or operated on a commercial basis. Through the Australian Government’s National Strategy for Critical Infrastructure Protection, however, the commercial sector and its private operators are involved in a variety of forums, along with State and Territory Governments, to manage threats, including terrorism, against the nation’s critical infrastructure.

There is a broad, yet coordinated, approach to national security and critical infrastructure protection. This includes a variety of strategies that involve the National Counter-Terrorism Committee and the National Intelligence Coordination Committee, and plans such as the National Guidelines for the Protection of Critical Infrastructure. The Australian Government’s 2010 Counter-Terrorism White Paper Securing Australia: Protecting our Community seeks to address the key objective of ‘taking all necessary and practical action to protect Australia and Australians from terrorism at home and abroad’.

12 Trusted Information Sharing Network for Critical Infrastructure Protection, October 2008, “Critical Infrastructure Protection Modelling and Analysis Program”, Fact Sheet, Commonwealth of Australia: Canberra, p. 1. Security initiatives which address Australia’s critical infrastructure protection, especially in the area of energy, include the Energy Infrastructure Assurance Advisory Group, and the application of the Critical Infrastructure Protection Modelling and Analysis Program (CIPMA). The CIPMA is a partnership between government and business decision makers, giving them access to the Trusted Information Sharing Network for Critical Infrastructure Protection is an “all hazards” programme that informs critical infrastructure protection. Managed by the Department of the Attorney General, CIPMA allows owners and operators of critical infrastructure to “prepare, prevent, respond to or recover from an adverse event”.
In regards to the location of current and proposed energy infrastructure projects, defence considerations need to be taken into account, thereby reducing any mismatch between defence posture and strategy. This situation can occur because State and Territory Governments have primary responsibility for the management of critical infrastructure that falls within their jurisdiction. This means that State and Territory Governments ‘have primary responsibility for the prevention of and response to potential terrorist incidents involving critical infrastructure.’.\(^{13}\)

The Australian Government, however, does continue to improve both its capacity and capabilities to minimise the threat from terrorism. Counter-terrorism capabilities continue to be strengthened through better linkages between the Australian Government and the States and Territories, improvements in maritime security measures, increased intelligence gathering capabilities, and a host of border protection activities.

### Potential Non-State Threats

A publication by the Australian Strategic Policy Institute, Our Western Front: Australia and the Indian Ocean, describes the range of threats and risks that present in the Indian Ocean region as ‘extensive and varied’. Authors Sam Bateman and Anthony Bergman list traditional maritime security concerns as ‘risks of interstate or intrastate conflict; threats to good order at sea, such as maritime terrorism, piracy, people smuggling and illegal fishing’ affecting the Indian Ocean region to also have a range of non-traditional security concerns. They include, but are not limited to, ‘climate change, transnational crime, marine natural hazards and energy, food, environmental and human security’.

Regional and remote critical infrastructure, such as the Pilbara’s mineral and energy projects, are an integral part of Australia’s economic earning capacity, much of which is exported along SLOCs to the global marketplace.

Crippling or damaging the economic earning capacity and investment confidence of a nation such as Australia is a key focus of the activities of terrorist organisations. Any potential attack on a mineral or energy project, onshore or offshore, or its associated critical infrastructure is likely to feature as a potential future target for a transnational terrorist organisation, or even a domestic terror cell. Economic assets with an iconic status and rich in symbolism, such as a Liquefied Natural Gas (LNG) tanker or a North West Shelf offshore installation, mean that they could be “in the frame” as any successful attack would achieve the dual aims of denting Australia’s economy and ensuring maximum media coverage for such actions.

Energy is treated by some terrorist groups as a legitimate target in order to increase oil prices, raise production and security costs at these installations, and generally destabilise Western economies.\(^{14}\) Some terrorist organisations have a doctrine which includes the selection of energy targets as a highly valued goal within their pursuit of damaging and destabilising economic hubs.

Terrorist organisations do focus on strategically high-value and iconic targets. They can include centres which extract, produce, process or distribute energy. Therefore, energy centres remain at risk from select groups and individuals seeking to damage and maximise their impact on a state’s economic capacity. Deterring and protecting potential “target acquisitions” must remain at the forefront of Australia’s defence and security plans.

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\(^{14}\) Rudner, M., 2008, ‘Protecting Critical Energy Infrastructure through Intelligence’, International Journal of Intelligence and Counter-Intelligence, Vol. 21, No. 4, p. 640. The purpose of the destruction of critical infrastructure, especially of critical infrastructure energy projects, is to achieve a stated goal of al-Qaeda, affiliates, and jihadist terror groups: to attack facilities that can cause the greatest economic damage. A 2004 al-Qaeda manifesto, The [Islamic] Laws of Targeting Petroleum-Related Interests and a Review of the Laws Pertaining to the Economic Jihad, states: ‘The targeting of oil facilities is a legitimate means of economic jihad’.
Broader Considerations

The threat posed to Australia’s critical infrastructure, mineral and energy projects are not, however, limited to terrorist organisations. The ever-changing global security dynamics indicate that major power conflict remains a possibility. The 2009 Defence White Paper states that ‘the ADF would have to comprehend the remote but plausible potential of confrontation with a major power adversary’.

The Australian Government seeks to have an ADF with a force which has the attributes and capability advantage out to 2030 in order to prevent, or prevail in, a conflict.

The Australian Government's measured analysis is that major powers may be operating in our strategic approaches in the most drastic circumstance, as a consequence of a wider conflict in the Asia-Pacific region. There has been a subtle yet strategic shift in focus from the Pacific Ocean to the Indian Ocean region. This trend is likely to occur over the long-term.

As the demand for energy from China and India increases, these states will seek to secure their supplies. Increased naval capabilities, construction of ports, and the conduct of surveillance will be done to maintain the passage of energy and trade through strategic chokepoints, from their sources to their domestic markets. Such activity could lead to heightened regional major power rivalry. This scenario would produce numerous challenges for the Australia’s defence and security planners.

Energy sources, however, are not just domestically produced but are also internationally sourced for an Australian market. Energy follows a long path on its way to market. From offshore oil and gas platforms, energy is transported through pipelines, processed, stored, loaded and distributed for consumption around the world.

The stages of the production and distribution cycle of energy via critical infrastructure do have a vulnerability to various types of risk, whether it is a non-state actor such as a terrorist organisation or single issue lone extremists, or the risk posed by major power rivalry.

Australia’s energy projects and energy supply lines remain especially vulnerable due to their on-going “target-rich” potential from such threats. It is recognised that personnel on critical infrastructure, such as offshore platforms, can be vulnerable to attack or even hostage-taking.

The strategic vulnerability of the energy production zone in North-Western Australia, especially the North West Shelf, was highlighted by the Karratha gas supply disruption in January 2008, and followed soon after in June 2008 with the Varanus Island industrial accident, where a pipeline explosion affected the flow of gas to Perth and the South West region of Western Australia. A dedicated attack, on such a site by a terrorist organisation or single issue lone extremist could prove catastrophic in disabling urban centres far from the scene of the event. An incident in one region can have a direct impact far from the critical infrastructure target. An attack could also be conducted remotely, through the use of cyber warfare techniques.

In regard to Australia’s energy security over the long-term, it is linked to timely investments that ensure the supply of energy is in line with economic developments, including critical infrastructure projects. In the short-term, however, energy security is tied to the ability of states to ensure the energy system is responsive to sudden changes in supply and demand. The International Energy Agency defines this state as ‘the broader need of ensuring energy security is progressively taking a more comprehensive approach to the

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16 International Energy Agency, ‘Energy Security’, 2009. The energy system can be defined as the different energy sources (coal, oil and gas), intermediate means (refineries and electricity), and transportation modes (pipelines, shipping, ports and power grids).
security of supplies, including for example, natural gas supplies and power generation.” Energy security over both the short- and long-term requires interface with investment, development and protection of critical infrastructure energy projects, as well as the ability to maintain strategic fuel reserves.

The global security situation and the demand for energy over the next 20 years are likely to become more competitive as states seek to secure the source and supply of energy. For many states, energy is becoming increasingly sourced from non-domestic locations. Threats to the security of supply of energy and goods across SLOCs will continue to come in a variety of forms, especially from non-state actors, such as that from modern-day piracy.

Piracy activity off the Somali coast in the Gulf of Aden, and across the north-west quadrant of the Indian Ocean region has been able to disrupt the free passage of vessels transiting this important shipping zone. The risk posed to sovereign interest, therefore, is not just to assets located within territorial waters, but also along SLOCs upon which shipping transports voluminous amounts of trade and energy. The strategic importance of protecting SLOCs remains a central tenet of national maritime doctrine. There is a need for the Australian Government to give consideration to the expansion of a strategic fuel reserve capability, a stand-alone source that is separate from the domestic supply chain. Consideration should also be given to exploring the production of synthetic fuels that are compatible for use by the ADF in its various maritime, land and aerial platforms.

Conclusion

The Indian Ocean region’s constantly changing and evolving strategic environment means that Australia will continue to face a range of challenges which have a relationship to protecting and defending its national interests, such as its mineral and energy projects, critical infrastructure, energy supplies and SLOCs. Also, a variety of future threats, such as a pandemic or increased non-state armed activity, may present themselves without sufficient strategic warning.

The growth of China and India, and their shared strategic ambitions of protecting their supply lines, may, in time, become a cause of inter-state friction and heightened naval activity in the Indian Ocean region. Regional conflict between states is a possibility.

The threat by states against Australia remains remote to non-existent in the medium to long-term. Australia must, however, recognise the growing strategic importance of the Indian Ocean region as it will have an influence on those parts of regional Australia which face this dynamic maritime environment. As the Indian Ocean region increases in its strategic importance, so does North West Australia and regions such as the Pilbara. Australia’s decision makers therefore will need to pay more attention to a host of factors when considering the strategic defence and security requirements of the Pilbara region.

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*This paper is a revised and expanded version of the original paper which was first published by FDI, 26 October 2010.

17 Ibid.
Pilbara Region – Key Features

Challenges and Threats to Regional Security

Liam McHugh
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KEY POINTS

• The Pilbara will experience significant growth in all sectors over the coming decade, and accordingly will increase in state and national cognisance.

• The developing population, resource, hydrocarbon and critical infrastructure sectors are highly vulnerable to existing and emerging threats.

• Human, environmental and industrial security challenges have the potential to stifle growth, impede development and have ramifications beyond the region.
Summary

The economic and social profile of the Pilbara will continue to increase in complexity over the coming decade. Bolstered by vast infrastructure projects, a growing population and a highly efficient, interdependent and maturing economic profile the region’s future seems ostensibly secure.

Existing and future vulnerabilities, however, have the potential to destabilise the region, and impact upon state and national security.

Analysis

Threat Assessment

The region’s population, iron ore, hydrocarbon and critical infrastructure will become increasingly vital, and accordingly at risk over the course of the next decade.

By 2020, the Pilbara’s population is expected to reach 62,000, primarily concentrated in the newly developed ‘Karratha City’ and ‘Port City’ (Port Hedland). The demographic transition from the current widely dispersed population of 45,000, to the Pilbara Cities vision of highly concentrated regional communities, leaves the populace more exposed to potential hazards and threats.

In addition to the residential population, the expansion of the resources sector will increase the number of transient fly-in fly-out (FIFO) workers drawing services from the Pilbara cities and satellite towns. In the event of a catastrophic incident, this additional transient population will increase the pressure on already strained critical services and amenities.

Current expansion in the iron ore industry is projected to continue. Sustained urbanisation and industrialisation in Asia will bolster current projects, lead to an expansion of new mines and create market opportunities for junior players. While risk management and employee safety will remain a paramount tenet of the industry, mining remains an inherently dangerous industry with the threat of industrial accidents, exposure to natural disasters and human acts of violence remaining constant.

Projected expansion of the offshore hydrocarbon industry with the Gorgon, Pluto and Wheatstone projects, along with the complementary onshore facilities, such as the Ashburton North Industrial Estate, will bolster the regional profile. The Pilbara’s oil and gas sector is projected to expand throughout the decade, continuing as a prime source of employment and revenue for stakeholders in the region. As current projects advance and are augmented by further developments in the industry, the susceptibilities within the sector will also dramatically rise.

The continued development of the Pilbara will depend upon the effective functioning of critical infrastructure and supply management networks, to provide regional employment, sustain private profits and continue economic diversification. The region’s growing role as an area of strategic importance is accompanied with an increased sense of vulnerability to existing, as well as emerging threats.

Regional Vulnerability

The forecast rise in the economic, social and political profile of the Pilbara makes its especially vulnerable to human, industrial and ecological challenges. The development of a successful risk management strategy is reliant upon understanding the potential magnitude of challenges to regional security. Previous national

experience and events in the international milieu provide an insight into the potential capacity of future threats to the Pilbara.

The lack of a present or emerging armed threat, combined with the ever-increasing interdependence between states, ostensibly guarantees Australian security over the next decade. Traditional security paradigms have encapsulated prevailing public perceptions of physical threats emanating from state actors. The definition of security, however, has evolved over the last few decades to include industrial and ecological considerations, as well as non-state actors.

Human

While the conventional threat to Australia remains negligible, non-conventional threats may exploit susceptibilities with potentially devastating consequences. These threats may range from terrorist organisations, disenfranchised individuals/groups, cyber warfare, industrial espionage, organised crime, pandemics, natural and industrial disasters.

The amorphous behaviour of non-state actors makes the prediction of their actions and the form that they will take a formidable task. The human security threat is likely to be autonomous, with their connection to an ideological maxim vague or not existent. Estimative intelligence from national and international experience suggests that non-state threats will be well versed in technology and will comprise of home-grown disenfranchised groups or individuals, such as the attempted Holsworthy Barracks attack.

The organisational devolution of terrorist organisations from hierarchical entities, such as Al Qaeda and Jemaah Islamiyah, to self-motivated autonomous units will not reduce their capacity to inflict catastrophic damage. The anonymity afforded to home grown terrorists provides privileged access and understanding of Australia, whilst simultaneously, operating beneath intelligence flags.

The reduced access to terrorist training camps and terrorist materiel will not prevent future attacks. As demonstrated by the 2007 Glasgow Airport attack and attempted attacks in Time Square, New York and the so called “Underwear Bomber” on Northwest Airlines Flight 253 in 2009 respectively, rudimentary devices may be manufactured from crude and accessible products and provide the desired maximum human, political and economic cost.

Comparative economic and social marginalisation of the Islamic diaspora, coupled with Australia’s increasing geopolitical importance as a middle power may act as the catalyst for radicalisation of elements of the Australian Muslim community. The arbitrary nature of terrorism makes prediction of the frequency of events impossible.

Whilst Islamic terrorism has been the topic du jour over the last decade, and will continue to feature in Australia’s national security discourse, “lone wolf” or sociopathic actors, such as disgruntled employees cannot be discounted as a threat.

The Pilbara lays vulnerable to economic targeting, which is a cornerstone of terrorist modus operandi and an attractive option for other human acts of violence. The projected expansion in the resource sector, with its subsequent infrastructure projects, will elevate the Pilbara’s existing economic profile.

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2 Department of Defence, Defending Australia in the Asia Pacific Century: Force 2030, May 2009
3 Department of Prime Minister and Cabinet, Counter Terrorism White Paper: Securing Australia – Protecting Our Community, February 2010
4 S. Mullins, Home Grown Terrorism: Issues and Implications, Perspectives on Terrorism, 2010, p. 256
The region’s growing export profile presents an attractive target for those seeking to achieve maximum economic impact through the disruption or cessation of projects. Economic targeting generates maximum impact, instigating global increases to commodity values, logistical and operational costs. Targeting of the Pilbara’s commodity base, particularly, the emerging hydrocarbon sector would cause disproportionate damage due to the low input/high consequence nature of energy sector terrorism. The threat to offshore facilities remains remote due to geographic barriers. Risk management strategies however, are required, in order to mitigate potential targeting of onshore facilities due for completion over the next decade, such as the Ashburton North Industrial Estate.

The risk of terrorist and other criminal networks exploiting the vulnerabilities inherent within critical and logistical infrastructure will continue to increase as the regional economy expands over the next decade. Attacks targeting maritime and port facilities, inspired by incidents in the Arabian Gulf and Horn of Africa remain a distinct possibility. Maritime terrorism, including suicide operations, could target existing congestion in the ports of Dampier and Port Hedland, creating a bottle neck and stopping exports for an extended period of time. Large ships, specifically bulk freighters, caught in the bottle necks of ports are highly susceptible to attack as they are too slow and cumbersome to avoid attackers. Similarly, pipeline infrastructure connecting offshore gas to onshore infrastructure will be highly vulnerable.

To alleviate projected deficits in employment the resource sector will invest in greater remote computer access centres for product extraction and management. Initiatives such as Rio Tinto’s “Mining for the Future” will streamline mine, plant, rail, port and utility management from Perth. Despite addressing projected productivity shortages, reliance upon computerised project management will simultaneously serve to increase vulnerability to cyber exploitation from individuals, terrorist, criminal and potentially state actors and competitors.

Low level threats may emanate from disaffected employees and potentially criminal entities motivated by the potential to cause economic damage or disruption in business, rather than inflicting causalities. These parties are likely to be involved in intellectual theft, vandalism, product, value or equipment tampering.

Industrial

As the Pilbara’s economic and infrastructure activity expands over the course of the next decade, so too will the regions exposure to industrial accidents. Such incidents have the potential to disrupt projects and stakeholder revenue, and will also carry a myriad of regional, state and national consequences.

The volatile nature of hydrocarbons highlights the highly consequential nature of offshore hydrocarbon projects, demonstrated by the Deepwater Horizon, Piper Alpha and Alexander Kielland catastrophes. The National Offshore Petroleum Safety Authority’s chartered mission “to independently and professionally regulate offshore health and safety” requires careful negotiation on the balance of constraining industry and protecting workers, whilst mitigating death, suffering, pollution and disruption to the local, state and national economy. The 2003 Varanus Island and 2009 Montana Oil leak illustrate that Australia is not immune to such accidents.

The supply management chain of the iron ore industry will remain susceptible to industrial accidents. Serious incidents involving rail and port facilities could delay and disrupt projects throughout the region. Protracted issues in logistics that result in a failure to meet contractual commitments would prove economically disastrous for both the region and beyond.

5 National Offshore Petroleum Safety Authority, Understanding NOPSA and How it Operates, August 2010
Ecological

Environmental challenges pose a formidable challenge to the resource industry. The Pilbara has a capricious ecology, categorised by long dry spells, punctuated by severe cyclonic activity. This provides a considerable challenge for risk management when combined with the vague predictions of climate change forecasting. Depressed first quarter profits from the mining giants due to torrential rain highlight the ecological challenges of the region.

Adverse ecological activity can also exasperate existing vulnerabilities causing industrial accidents. Natural disasters do not preclude businesses of their environmental responsibility. Cyclonic activity may cause flooding which can release contaminants from mining operations or damage critical infrastructure in turn causing environmental damage.

Impact

The growing spectrum of aforementioned threats, combined with the increasing complexity of regional assets places the Pilbara in a highly vulnerable position over the next decade. It is imperative, particularly when evaluating prevention and response options, to consider the human, economic and reputational implications of potential regional challenges.

The potential human, cultural and heritage loss from a catastrophic incident in the Pilbara is difficult to quantify and will be dependent on the intensity of the disaster. It is clear, however, that a higher concentrated community will increase the probability of exposure to the impact of human, natural and industrial challenges. The regions vulnerability to such challenges impedes development and may slow the region’s required five per cent growth rate to meet population projections. Decreased growth will exasperate projected worker shortages stifling economic diversification and objectives consistent with the Pilbara cities vision.

The resource and hydrocarbon industries have attempted to mitigate the impact of catastrophic disaster through long term contracts with suppliers and customers. Through “force majeure” clauses, these agreements protect the parties in the event that elements of the contract cannot be performed due to factors that are outside control of the parties.

Medium to long term productivity, however, may be negatively affected. In the aftermath of a disaster companies will be forced to raise the costs of transactions due to externalities, such as increased security measures, higher insurance premiums, and increased costs of counterterrorism, natural and industrial regulations. Rising project and product costs, coupled with perceived risk elevation and expansion to ever increasing sources of commodities may damage the Pilbara’s standing as a secure market. Damage to consumer and investor confidence in the region could have catastrophic economic ramifications.

Significant damage to the Pilbara from a security challenge may divert Royalties for Region’s investment and impede the development of the Pilbara Cities project. Elements of the community may also experience decreased resilience and enthusiasm for further development of the region, making negotiation and agreement with government and industry fractured.

Conclusion

Regional complacency and current deficiencies in risk management policy are inconsistent with the Pilbara Cities vision. Realisation of the scheme is dependent on proactive and dynamic strategies to mitigate threats and challenges.

Over the coming decade, regional, state and federal stakeholders must engage in constructive dialogue to ensure that the region is able to withstand potential challenges and fulfil its projected economic and geostrategic capacity.

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Black Swan in the Engine Room: Australia’s Ability to Manage Catastrophic Disaster in the Pilbara

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KEY POINTS

• Regional development in northwest Australia suggests that the Pilbara will increasingly continue to be a significant generator of wealth for Australia, Western Australia and the region itself.

• The rise of the Pilbara’s economic profile is accompanied with an increased sense of vulnerability to existing, as well as emerging threats. These threats may be human, environmental or industrial.

• The region has some experience of natural disasters and industrial accidents, such as cyclones and Varanus Island. These events have shown how vulnerable the region is to emergency situations and the challenge of dealing with them.

• The Pilbara’s economic credentials and importance as a resource and energy export hub make it particularly vulnerable to catastrophic disaster.

• The circumstances and consequences of such events require a unique emergency management response. Currently, doubts remain over Australia’s ability to manage a large-scale disaster.
Summary

Australia is experiencing an unprecedented expansion of its minerals and energy sectors. The Pilbara region of northwest Western Australia is a significant part of this outcome. Much of this involves on- and off-shore facilities that are vulnerable to natural disasters, industrial accidents and, potentially, acts of sabotage and other forms of violence and destruction.

A relatively minor disruption may result in a significant and costly loss of production. Nor is the cost restricted to export earnings: loss of employment, environmental damage and the impact on local, regional and national economies cannot be under-estimated.

To help prevent and alleviate such disasters, Australia requires a national capability. This capability must be able to plan for such disasters. It must have an analytical and research capacity, the ability to develop the necessary doctrine and capabilities and the authority to deploy and direct assets.

Capabilities require time to develop. This involves not only identifying the personnel needed but also considerations relating to doctrine, training and preparation, equipment and communications and aspects of command and control.

Many of these capabilities will not necessarily be dedicated to disaster or emergency management. Instead they will include existing national and state emergency and security forces as well as health, communications, transport and other agencies. Well-established disaster management forces within the private sectors should also be incorporated.

Analysis

The Pilbara 2020:

Australia's continued prosperity and economic credentials will increasingly rely on the Pilbara. Popularly referred to as the ‘engine room of Australia’, the region’s economy is based on the extraction, processing and export of minerals and energy, providing $71 billion to the national economy in 2010. In context, this represents six per cent of Australia's Gross Domestic Product (GDP) or the individual GDP equivalent of 104 of the world's 184 nations.

Commentators, including the Reserve Bank of Australia, have contended that the current ‘resource boom’ in the Pilbara was a significant factor in allowing Australia to avoid the severity of the Global Financial Crisis. The sustained growth of the Pilbara ensures that the activity in the resource and energy sectors will spill over into greater national economic opportunities, through demand for labour, intermediate inputs and investment, and payment of taxes and royalties.

Over the coming decade, the region’s already advanced iron ore and hydrocarbon sectors will be further augmented by new projects. By 2018, the Pilbara Development Commission projects the total earned annually by these sectors to be approximately $211 billion, constituting seventeen per cent of Australia’s GDP. A disproportionate ratio for a population projected to reach only 62,000 in the same period.

The logistical hubs of Port Hedland and Karratha will further increase in significance, as they service the offshore Carnarvon Basin. Endowed with Australia's largest known oil and gas reserves, the Basin will provide an increasing strategic share in Australia's oil production, particularly as Bass Strait production continues to decline. Australia, and more particularly the Pilbara, has the potential to become the world's leading exporter of liquefied natural gas (LNG) over the coming decades.

1 Pilbara Development Commission, Future Development of the Pilbara, 2011, p.3
Multinational and local hydrocarbon producers have successfully marketed Australia's comparatively low sovereign risk and the benefits of LNG to allow the nation to become the world's fourth largest supplier. The development of the Wheatstone, Gorgon and Pluto projects suggest Australia could be the largest producer by 2030. Such developments suggest that the region will be not only feature as an integral consideration for Australia's energy security, but also a key concern for nations in the energy-conscious Indo-Pacific and potentially beyond.

The Pilbara is responsible for a little under forty per cent of the world’s iron ore production. Mining companies have capitalised on the region’s large high-grade reserves, proximity to key strategic markets and relative industry efficiency, to meet the seemingly insatiable demand from emerging markets. In 2010, iron ore production was worth $46.5 billion to the national economy, representing three per cent of GDP, with 95 per cent of production based in the Pilbara.

Continued structural changes to the Chinese economy, as it transitions from an agricultural to a manufacturing base, will lead to an increasingly urbanised population with a rising per capita income, intensifying steel demand for on-going investment in housing and infrastructure. Beyond China, economic development in South and South-East Asia presents further scope for demand, as other states transition to their phases of intensive growth in steel requirements. Acknowledging this, current operations in the Pilbara will be complemented by significant expansion projects, including Solomon, Roy Hill and the West Pilbara, which will serve to meet projected demand. Committed and proposed iron ore projects have the potential to contribute more than $65 billion to the national GDP.

The Western Australian government’s $1 billion ‘Pilbara Cities’ initiative, suggests demographic and critical infrastructure developments will mimic economic growth. The Royalties for Regions scheme will target key delivery areas, including infrastructure coordination; community projects; land availability and development; and economic diversification, to turn the initiative into a reality. The vision will attempt to transform Port Hedland and Karratha into modern dynamic urban centres, comparable to Townsville-Thuringowa in North Queensland. The initiative remains ambitious and significant inhibitors to this demographic and social development remain. Irrespective of this, however, the region will loom larger in the national psyche and will develop an increasingly complex social character in the coming decades.

Catastrophic Disaster

Clearly then, the Pilbara will be of continued economic and strategic importance to state and national interests. Disruption by human, industrial or environmental agents would have a catastrophic impact on the national economy and also potentially broader ramifications. This was recently demonstrated by the 2011 Queensland Flooding; heavy rains inundated the Bowen Basin between Cairns and Georgetown, home to the country’s metallurgical coal industry. The floods caused the loss of 15 million metric tons or 20 per cent of coal exports for the first quarter of 2011. According to the Australian Bureau of Statistics, the $2.5 billion loss caused the largest quarterly fall in GDP since 1991. Australia’s primary export partners, including China, India, Japan, Taiwan and South Korea, were also heavily impacted.

Were an event of this magnitude to occur in the Pilbara, the impact would be significantly magnified, and would constitute what Emergency Management Australia (EMA) defines as a ‘catastrophic disaster’. According to the EMA’s definition, a catastrophic disaster is an extreme hazard event with severe economic, health, social and environmental consequences, which cannot be resolved by existing state and national disaster management capabilities. The two defining measures of such an event are that it will:

- Not be possible to immediately meet the needs of those requiring assistance within the existing capability of an individual state or territory, or nationally
- Take a considerable time to recover
While Australia has faced relatively few events that have met these criteria, State and Federal governments recognise the importance of well-developed emergency and risk management arrangements. Australia has an advanced capability to meet hazards but the rapid growth in the Pilbara's economic and social profile, presents significant and unique challenges that require an enhanced practice to manage potential ‘black swan’ events.\(^2\)

**Australia’s Disaster Management Doctrine**

Universal disaster management doctrine has progressively evolved over recent decades, particularly post-September 11, from notions of ‘response and recovery’ to an increased institutional and policy focus on ‘planning’ and ‘preparedness’. The paradigm shift reflects the logic that the need for strong, well-resourced and forward thinking contingency plans is imperative, to tame and control a crisis.

Within this context, the primary role of policy makers and crisis managers is to establish institutional frameworks and foster cultural climates that develop community resilience and reduce vulnerability. To achieve this goal, vulnerability assessments consider a broad range of threats, rather than focussing on specific hazards. Additionally, policy and management plans consider a range of variables, which may influence potential threats and capacity for preparedness, response and recovery. The maxims of ‘preparation’ and planning now characterise major UN policies, as well as current policy and practice in the United States, United Kingdom, New Zealand and Canada.

Consistent with this approach, the 1989 ‘Commonwealth Counter Disaster Concepts and Principles’ published by the Natural Disasters Organisation (NDO), the predecessor organisation to Emergency Management Australia, advocated four guiding principles:

- An all-hazard approach;
- A comprehensive approach;
- An all-agencies approach; and
- A ‘prepared community’ approach

The guiding principles detailed in the document emphasised the importance of: threat analysis; organisation of assets; arrangements for command, control and co-ordination; mechanisms for information management; and development of rigorous contingency plans.

Since the NDO’s publication, Australia’s disaster management apparatus has experienced significant shifts in structure, focus and methodologies. Yet, the publication remains Australia’s guiding volume in the legislation, planning and organisational arrangements for disaster management. Comprehensive and integrated themes have become the defining principles of Australia’s crisis doctrine.

**Comprehensive Approach**

Stakeholders in emergency management have recognised that Australian communities must have the capacity to meet a broad-base of challenges; these hazards may originate from natural, industrial or social agents. Accordingly, Australia has adopted a comprehensive, all-hazards approach to disaster management; recognising this, communities have adopted Prevention, Preparedness, Response and Recovery (PPRR) activities, to reduce susceptibility to potential hazards.

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2 An unpredictable event with significant implications.
Prevention activities refer to strategies to mitigate the impact that potential threats may create. This is achieved through fostering community resilience and/or reducing susceptibility to potential hazards. A large focus is further placed on Australia’s comprehensive approach on preparedness activities, within which arrangements and contingencies are developed, to be employed if and when disasters eventuate. In the event of disaster, response strategies denote the activities enacted by stakeholders to manage the situation. Finally, in the post disaster stages, recovery activities aim to reconstruct physical infrastructure and undertake the ‘restoration of emotional, social, economic and physical well-being’.

**Integrated Approach**

Policy makers and risk managers have recognised that for Australia’s risk management capability to be effective, arrangements must exist for the coordination and organisation of stakeholders involved in PPRR activities. As a result, relevant organisations and agencies alongside the local, State and Commonwealth governments have developed an all-agencies approach to develop appropriate legislative and public policy frameworks and foster community preparedness. In this context, resilience is a responsibility shared with various stakeholders, including government, committees, businesses and individuals, not solely the responsibility of emergency management agencies.

This approach to disaster management was approved in November 2008 by the Ministerial Council for Police and Emergency management and confirmed by COAG in December 2009. To build on this work, COAG established the National Emergency Management Committee, which authored the 2011 National Strategy for Disaster Resilience.

**Leadership in times of National Disaster**

Disaster management in Australia involves all three levels of government. Emergencies of national consequence, however, as in the instance of a catastrophic incident in the Pilbara, would go beyond the remit of existing arrangements.

Recognising this, in 2008 COAG endorsed the Model Arrangements for Leadership during Emergencies of National Consequence (the Model), to supersede the National Emergency Protocol of 2006. The Model serves to guide response and recovery strategies in emergencies of “national level policy, strategy and public messaging or inter-jurisdictional assistance”. In endorsing the model, COAG recognised the importance of clarity for the roles and responsibilities of the various relevant authorities and stakeholders in an emergency of national consequence.

**Local Government**

Local Governments in the Pilbara, although likely to be quickly sidelined in the event of a catastrophic disaster, have significant responsibility for regional emergency management. In partnership with the State Government, local authorities play a vital role in prevention and mitigation activities and strategies. The Pilbara’s regional council responsibilities include:

- Undertaking hazard mitigation strategies, including risk assessments, public education and community awareness programmes;
- Representing Pilbara interests and concerns within State and Commonwealth emergency management forums;
- Liaise in post disaster analysis and assessment
Western Australian Government

Under Australia’s constitution, the State and Territory governments have primary responsibility for emergency management within their territorial and legislative jurisdiction. According to EMA’s Australian Emergency Management Arrangements, these responsibilities include:

- Coordinating legislation, policy and implementation of comprehensive emergency management strategies;
- Engaging and fostering relationships with relevant stakeholders, including the commercial sector; local governments and Indigenous communities, to assist in the implementation of disaster PPRR activities;
- Ensuring provision of adequate prevention and management strategies. State Governments must develop emergency awareness, education programmes and warning systems to ensure community resilience and response

In Western Australia, the Emergency Management Act 2005 provides the framework within which relevant agencies and stakeholders operate. The Act and corresponding regulations, such as the Emergency Management Regulations 2006, detail the roles, agencies and plans of Western Australia’s disaster management policy.

Within the framework, overall responsibility for disaster management rests with the Minister for Emergency Services, who operates through Western Australia’s peak emergency management body, The State Emergency Management Committee (SEMC). Comprised of senior executive members from State organisations considered essential to emergency management arrangements, the SEMC’s key functions include:

- Providing assessments to the Minister on disaster management systems and detailing the State’s preparedness to meet potential contingencies;
- Liaising and directing all stakeholders, including government entities, the industrial sector and broader community, to develop efficient emergency capabilities;
- Acting as a conduit between community assessments and policy, to enhance resilience in those likely to be affected by potential threats;
- Driving the preparation of policy and planning, including the monitoring and review of the Emergency Management Act, to ensure Western Australia has an adequate level of preparation and resilience to meet challenges

Importantly, the Commissioner for Police, the SEMC’s Executive Officer, acts as the authority to request Commonwealth government assistance.

Commonwealth Government

While State governments retain primary control in the development and implementation of disaster management policy, the Commonwealth government is nonetheless an equally important party, particularly in the event of a catastrophic incident.

Commonwealth disaster management agencies coordinate federal disaster contingencies, through: disaster research, including meteorological, hydrological, geo-physical and geo-data assessments; information management; and providing national leadership in disaster mitigation strategies.

Additionally, in the Australian Emergency Management Arrangements it notes that the Commonwealth has specific responsibilities for ‘national security and defence; border control; aviation and maritime transport; quarantine; astronomical and meteorological observations; enforcement of Commonwealth
legislation; and international relations’. All likely considerations, with corresponding federal agencies, that would have significant involvement in the event of a catastrophic incident.

In the event that state responses to emergency events are insufficient, such as in a catastrophic disaster, the Commonwealth, in conjunction with the affected state may provide operational support and mobilise additional resources. Assets assigned are likely to take the form of assistance from the Australian Defence Force.

Commonwealth responses to disaster mitigation and management are undertaken by EMA. In the event of a catastrophic disaster, including a large scale natural disaster or terrorism, the Federal government would coordinate response from the Crisis Coordination Centre. The newly-opened Centre can accommodate 100 people and features secure video teleconferencing and high-speed communication links.

**Coordination Arrangements**

In the event of an emergency of national consequence, clear coordination arrangements are of vital importance, to ensure a rapid response and the delivery of support. Accordingly, Australia has adopted a graduated response and recovery arrangement. In the event of an emergency, the Local and State Governments are responsible for emergency response and incident management within their jurisdictions. In large-scale contingencies, intra-state, inter-state and Commonwealth assistance may all be provided.

A catastrophic disaster, however, would require enhanced State/Commonwealth coordination and assistance provisions. Supporting this notion, the Model provides clear lines of communication and coordination for relevant stakeholders, as demonstrated in Figure One. The enhanced governance communication arrangements are designed to allow the Prime Minister and the Premier to liaise and develop strategies to respond and recover from the event. Consultation may include policy, strategy and communication of important information to the public.

**Strengths**

**All-hazard Approach**

The all-hazard approach, a fundamental element of Australia’s emergency management system, ensures that disaster managers are prepared for a variety of potential contingencies.

In the post-September 11 environment, in global disaster management preparations, the salient, yet measured, hazard of terrorism threatened to subsume traditional emergency mechanisms. The numbers

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3 Emergency Management Australia, Australian Emergency Management Arrangements, 2009 p.18
of stakeholders involved in the emergency management arena increased, requiring even greater levels of coordination. While terrorism presents a number of unique challenges, in much the same way as industrial accidents and natural disasters have their own idiosyncrasies, many of the consequences and planning arrangements are likely to feature inevitable similarities.

Australia, while expanding counter-terrorism legislation and capability, recognising the potentially increased threat, has importantly maintained the all-hazard approach to emergency management. Emergency management consideration has focussed on a large range of possible contingencies, from human, industrial, and environmental agents, while simultaneously developing unique measures for specific hazards when necessary. As Pavel Baev, a senior researcher at the International Peace Research notes:

‘it was Katrina not Al Qaeda that devastated the platforms and refineries along the U.S. Gulf coast in August 2005; it was a short circuit not a well-placed bomb that caused the massive blackout in Moscow in May 2005; and it was not a shoot-out but a labour strike that stopped the pipeline construction in Azerbaijan in November 2005.’

Thus far, Australia has had the resilience to respond to disaster contingencies, due to vigilance by emergency managers in securing against a range of potential perturbations.

Resilience

In recent history, the concept of resilience has featured as a key property of the Australian emergency management system. Traditionally, the term ‘resilience’ has been applied to the material sciences, referring to an object’s ability to return to its original form following deformation. Since the 1970’s, however, the term has been adopted, as part of emergency managers’ vernacular, in a more metaphorical sense. Disaster resilience refers to a system’s capacity to ‘prevent, mitigate, prepare for, and recover from the impacts of disasters’.

The resilience-focus of Australia’s disaster management doctrine ensures the impact of disasters are minimised. Recognising the adage ‘an ounce of prevention is worth a pound of cure’, emergency stakeholders led a change and coordination effort to withstand disaster contingencies and consequences. These demands include understanding the risks to the community, economy and environment; reducing identified risks; enhancing the capabilities of parties likely to be effected; and supporting the developments of relationships between stakeholders. As Kofi Annan notes:

‘Building a culture of prevention is not easy. While the costs of prevention have to be paid in the present, its benefits lie in a distant future. Moreover, the benefits are not tangible; they are the disaster that did not happen’.

Further, resilience relies upon efficiently and effectively coping with the consequences of disasters when they do occur. Hazard programmes allow communities to return to a pre-disaster state quickly and, importantly, to function at a higher level by learning from their experiences. Vitally, Australia’s emergency management system recognises that resilience is a dynamic process, developed and strengthened over time, enhancing, rather than replacing, existing strengths and arrangements.

5 Annan, K., Facing the humanitarian challenge: Towards a culture of prevention, New York, US; Sep. 1999, p.1
Policy and Structure

No level of advance preparation can fully mitigate disaster. To avoid hesitation or paralysis during a crisis, disaster managers must consider the possibilities inherent in a broad-range of contingencies. It is therefore essential that disaster management agents develop a measurable response capability for a range of threats and challenges. The infrastructure of crisis coordination must be clear, regularly reviewed and able to be enacted quickly in the event of a crisis. It involves the drafting of policy; development of doctrine; and establishment of protocols to ensure information and resources are shared, decisions reached, promulgated and implemented.

Ostensibly, disaster management agencies within Australia recognise and support this concept; demonstrated by COAG’s endorsement, in February 2011, of The National Strategy for Disaster Resilience. In the recent past, the graduated level of response, coupled with legislatively mandated roles and responsibilities, has ensured a satisfactory response from Local, State and Commonwealth agencies during crises.

The codifying of State and Local accountabilities goes some way to developing a truly operational framework for disaster response. Additionally, Western Australian disaster management policy clarifies and effectively integrates national response plans. While the mere existence of emergency legislation and plans does not automatically guarantee adequate response, their presence provides a foundation in which prevention and action pre- and post-disaster may occur. Most importantly, accountability fosters technical and political collaboration between Local, State and Commonwealth agencies. This is demonstrated in the Pilbara, where the Pilbara Security Collective, with participants from government agencies and the private sector, provides a quarterly forum within which security challenges and issues are discussed. On a larger, more strategic scale, disaster management has featured heavily in COAG discussions over the last few years.

Australia’s ‘graduated’ system of emergency management has historically proven to be efficient, and will continue in the future to be most appropriate for most contingencies.

Local and State resources will be ideally positioned within range of disaster sites so as to rapidly respond to initial alerts. Additionally, these agencies should have knowledge of local conditions and even, potentially, have secured agreements with regional and state entities for mutual aid and assistance. Commonwealth emergency response is likely to be geographically distant and hence slower.

Furthermore, Federal entities are likely to lack local knowledge and may potentially be unable to rapidly integrate with local efforts in the manner required during a crisis. Accordingly, EMA plays a subsidiary role in Australian disaster management. Rather than providing deployable staff for operations, EMA’s primary role is during the pre- and post- stages of a disaster. Other federal agencies, with greater capacity and resources, may be deployed, but as a support to State operations, rather than a primary role.

In the event of a catastrophic disaster, recognising the greater complexity of such events, scope exists for leadership or certain responsibilities to be transferred from the initial disaster manager to more senior emergency stakeholders. These provisions would allow those with different skills, broader authority and greater resources to provide the necessary solutions to resolve the crisis.

It is important to note, however, that Australian ability to respond to a disaster of catastrophic magnitude has not been tested. In ‘Taking a punch: Building a more resilient Australia’, Anthony Bergin and David Templeman note that a level of complacency exists within the Australian community about the nation’s ability to deal with a wide-range of disasters. The response to the 2002 Bali Bombings gave the impression that Australia was prepared for a disaster on the scale of a Hurricane Katrina. Yet, no true litmus-test event has occurred in Australia as a benchmark.

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6 Begin, A., and Templeman, D, Taking a punch: Building a more resilient Australia, Canberra, May 2008
Depoliticised

The framework for emergency response functions requires well-defined and consistent direction, coupled with a clearly prioritised set of purposes. Recognising this, many nations, including the United States and Australia, have adopted regulations and mechanisms to predetermine and coordinate the role and extent of the involvement of political leaders and operational commanders during a crisis. Unlike the United States, however, Australian emergency response systems are largely depoliticised. According to Andrew S. Mener, from the University of Pennsylvania, the American disaster management system suffers from ‘irrationally lenient disaster declarations’.

Mr Mener attributes high-levels of declared ‘disasters’, to the expanded role American politicians play as disaster managers during a crisis. American State governments have, in the recent past, declared a ‘disaster’, forcing Federal involvement, in contingencies that could have been handled by the states, to avoid potential political and economic fallout. While Federal resources are invested in relief operations and reimbursements, focus on mechanisms for truly catastrophic disasters, including policy; structure; capacity building and resources are neglected. As demonstrated by the State Emergency Committee, with its sole responsibility to declare a disaster, the bureaucratic nature of Australian disaster management ensures a depoliticised, and, accordingly, a more effective system.

A catastrophic incident in the Pilbara would cut across a range of organisational, jurisdictional and governmental boundaries. Vitally then, Australia’s politically neutral disaster management system: fosters collaboration; enhances policy; and promotes integration of structures and systems. Led by all levels of the bureaucratic network, existing strategic and consultative planning processes ensure appropriate legislation, policy guidelines and protocols.

Bureaucratic provisions, from ad hoc networks across disaster management stakeholders, to formal arrangements such as, ‘Inter-jurisdictional emergency management coordination’, further enhance coordination for disaster reduction and response activities and systems. The organisational approach allows for vitally important relationships, capacity and knowledge sharing that would be extremely difficult in a politicised American-style system. As is so often the case, however, in a Commonwealth system of government, scope exists for more clarity and greater cooperation in disaster management between the levels of government.

Challenges and Limitations

Australia has avoided the ‘Big One’

Australian exposure to catastrophic disasters has been limited. As previously discussed, no true litmus-test event has happened, creating public complacency, a significant concern in a system that places heavy emphasis on the community.

While Australia has a robust disaster management system, luck has played an equally important role in avoiding a catastrophic disaster. Australia’s lack of experience in facing the ‘Big One’, means that disaster stakeholders do not have first-hand knowledge of post-event, ‘lessons learned’ analysis, a critical element in the assessment of capability and functionality.

There remains a dearth of public information from State and Commonwealth management agencies to

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8 National Counter Terrorism Committee, National Counter Terrorism Plan, Canberra, 2008, p.23
counter this point. Fundamentally, it must be recognised across all levels of government, and reflected in accompanying documents, that catastrophic events require a unique management system.

**Coordination**

The Commonwealth Government must adopt a greater leadership role in emergency management to enhance national prevention and response capability. The graduated response approach has worked well and, in the future, will continue as the logical approach to most contingencies. In catastrophic circumstances, however, direct federal intervention will be necessary. These events will be fundamentally different from other emergencies. Their scale and rapidity will require an immediate authoritative response, crossing various jurisdictions with significant demand on resources and assets.

Nascent developments, including the Commonwealth policy on management of counter-terrorism and the publication of the National Strategy for Disaster Resilience, must be expanded.

Scope exists for the EMA to play a greater co-ordination role in the event of a catastrophic incident. Command and control functions are best placed within the States’ jurisdictions, and are constitutionally guaranteed. Opportunity exists for the EMA to act as the primary federal coordination vehicle, managing the Federal response, inter-state resources and potential international support.

An expanded EMA, with supporting legislation, would also improve efficiency. Currently, more than 30 federal emergency response plans exist across the various federal agencies. The EMA could reduce duplication and promote due diligence, by monitoring, testing and exercising response plans.

Additionally, the Federal Government should commission and make freely available a National Catastrophic Disaster plan, based on the National Counter-Terrorism Committee's National Counter-Terrorism Plan. The National Strategy for Disaster Resilience represents the foundation of this proposed document. As the body responsible for the implementation of the strategy's recommendations, The National Emergency Management Committee should produce a document that clearly articulates the roles, responsibilities and arrangements for local, state and federal stakeholders. The document would be popularly received right across the public and private sectors, removing ambiguity and promoting accountability.

**Inter-Organisational Relations**

Planning the response to catastrophic disaster requires inter-organisational coordination. Disaster in the Pilbara would constitute an interdepartmental issue for the Western Australian government. Similarly, a large-scale disaster impacting the Pilbara’s economic profile would be an inter-governmental issue, requiring direct Commonwealth involvement. Planning and response to large-scale disasters requires involvement and consultation with a number of agencies with threat-relevant expertise.

During non-disaster periods, entities with roles and responsibilities during an emergency operate independently of each other, often in silos. Yet, during a disaster different agencies may be thrust together and expected to work in concert to provide assessments, support, protection, and so on. Many of these agencies, particularly at a State or Commonwealth level, will have their own processes, information, applications and technology.

To enhance disaster response functions, a concerted effort is required by all entities to achieve greater awareness of the stakeholders involved in emergency contingencies. An increased awareness of the roles, structures, culture, mechanism, strengths and weaknesses of responding stakeholders, will ensure efficiency and avoid ‘social loafing’ during a crisis.
Increased awareness has its foundations in the planning process. Greater consultation between agencies and inter-agency professional development, provide low-cost, high impact policy options that would significantly enhance current readiness and reduce confusion around jurisdictions. Training and joint exercises are also a significant part of this outcome, and are considered in greater detail below.

Role of the ADF

Currently, the Australian Defence Force (ADF) provides support during a disaster upon request from the State Government. By definition, however, a catastrophic event will overwhelm current arrangements, creating a requirement for an expanded Defence role.

Defence possesses the most suitable – possibly even the only – assets capable of reaching the Pilbara to provide medical, logistical and engineering support in an extreme event. The ADF, as demonstrated in international catastrophes, such as Operation Pakistan Assist II, has a demonstrated and proven ability to provide mass care, deploy resources and support recovery operations.

Undeniably, Defence culture fosters organisational and leadership qualities vital for disaster coordination. In recent history, these credentials have seen Defence personnel take a leading role in response and recovery operations; demonstrated by Major-General Mick Slater’s role in the Queensland flooding. This convention should be codified in future catastrophic emergency documentation, which would help to ensure the Prime Minister is kept abreast of response activities and emergent needs in the affected areas.

It is neither necessary nor advisable for the ADF to expand its role to include increased support during conventional emergencies. It is beyond the remit of the ADF to provide sustained support during such contingencies, and could drain resources from established objectives. Importantly, though, scope must exist for direct ADF involvement in the event of a catastrophe. As David Templeman and Anthony Bergin argue, ‘military expertise in network-centric warfare could be shared with first responders to developed network-centric emergency management’. Although demanding, these contingencies are likely to be smaller than military operations and will not significantly affect the military readiness of personnel. On the contrary, catastrophic relief activities may mimic ADF wartime support operations, promoting preparation for future missions.

Public / Private Partnerships

The Pilbara is home to a significant share of Australia’s onshore and offshore critical infrastructure. Current and projected projects will see this ratio rise dramatically over the coming decade, particularly in the offshore sector. The Australian Government defines critical infrastructure as;

‘those physical facilities, supply chains, information technologies and communication networks which, if destroyed, degraded or rendered unavailable for an extended period, would adversely impact on the social or economic well-being of the nation or affect Australia’s ability to ensure national security’.

Approximately 90 per cent of Australia’s critical infrastructure is privately owned or operated on a commercial basis. The Australian Government’s National Strategy for Critical Infrastructure Protection, provides a forum for the commercial sector and its private operators to manage, along with government agencies, potential threats and challenges to assets.

While the strategy provides a positive framework, there is scope for significant enhancement, particularly
in fostering goodwill among companies with business interests in the Pilbara. Woodside, operator of the North West Shelf project, alleged that information shared with the Attorney General’s Department Trusted Information Sharing Network (TISN) initiative, had been leaked to competitors.

Catastrophe impacting on the performance of critical infrastructure will rely upon dialogue and an effective rapport between the public and the private sector, to formulate solutions and continuity plans. As a matter of some urgency, initiatives should be developed and enacted, to develop this relationship. Such developments, would promote confidence within the private sector and resolve a number of the short comings identified in the Force Posture Review, at a much reduced cost and ADF demand.

**Exercises**

Exercises simulating disaster can provide a forum to critique proposed response operations. Observers in the aftermath of Hurricane Katrina noted that exercises:

> ‘Provide an accurate picture of how well the federal government can both coordinate the actions of its own agencies and work collaboratively with state and local governments in responding to a catastrophe.’ 11

Official and scholarly post-exercise reviews support this judgment. Simulations, particularly those that involve senior officials, strengthen the core functions of emergency organisations, subsequently enhancing preparedness. In a country the size of Australia, distance remains a key issue and nowhere is this more so than in Western Australia. The sheer distance between Canberra and the Pilbara, or even Perth for that matter, highlights the importance of increasing operational awareness of the region.

Given that nothing compares to first-hand experience, priority should be given to encouraging visits to the region by senior State and Commonwealth disaster stakeholders. Emergency managers can then experience directly the unique qualities and challenges of the region and its emerging emergency management needs.

Furthermore, drills offer an opportunity for disaster managers and responders to develop a rapport. At times, prior to a catastrophe, these may be disparate groups. Extreme disaster, however, may potentially blur boundaries and, for instance, could see primary health care providers working with ADF personnel. Exercises will provide opportunities for collaborative relationships, that will help facilitate response operations in the event of a contingency.

At a functional level, realistic exercises will provide insight into response plans. Drills provide important operational details, including scale of response and cost. Simulation activities also provide opportunities to test surge capacity and capability, and, if required, improve response plans.

**Conclusion**

The expansion of the Pilbara in social and economic development represents a significant disaster management concern.

The growth of Port Hedland and Karratha into medium density urban centres, concentrates a population into one of the most climatically violent locales in Australia. Assessments of the effects of climate change for the region are equally pessimistic.

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11 Wormuth, C., and Witkowsky, A., Managing the Next Catastrophe: Ready or Not?, Centre for Strategic and International Studies, June 2008 p. XI
Over the coming decade, planned economic and infrastructure activity will increase exposure to industrial accidents. In addition to disrupting project and stakeholder revenue, such events bring a myriad of regional, state and national consequences.

The rise of the Pilbara’s economic profile is accompanied by an increased sense of vulnerability to existing, as well as emerging, human threats. The Pilbara’s export credentials may present an attractive target, with low-input, high impact results.

As the region grows in economic and strategic significance, it is imperative that strategies exist and are exercised, to mitigate such contingencies.

To achieve this, national disaster management reform is required. Catastrophe management strategies should form a policy priority for Local, State and Commonwealth Governments. Failure to prepare for ‘black swan’ events, bring not only direct ramifications for the community involved, but, as demonstrated by the Pilbara, a myriad of national and potentially international consequences.
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