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Transitioning Regional Economies

Productivity Commission

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About CME

The Chamber of Minerals and Energy of Western Australia (CME) is the peak resources sector representative body in Western Australia. CME is funded by its member companies who are responsible for most of the State's mineral and energy production and are major employers of the resources sector workforce in the State.

In 2015-16, the value of Western Australia's mineral and petroleum production was $88 billion. Iron ore is currently the State's most valuable commodity, accounting for more than half the State's production value at $48 billion. Petroleum products (including LNG, crude oil and condensate) follow at $18.4 billion, with gold third at $10 billion.

The sector is a major contributor to the state and the Australian economy. The estimated value of royalties the state received from the resources sector composed almost 34.8 per cent of estimated total state revenue in 2015-16, or around $4 billion (Iron Ore - $3.4 billion).

Key Findings

- While a transition is underway from a mining investment boom, the economic and social contribution of the Western Australia resources sector continues to be significant to the National, Western Australian and regional economies as a consequence of the ongoing, typically larger, operations that are the result of that mining investment boom.
- Policies designed to promote diversification of regional economies post the mining investment boom, must also take into account comparative advantage of a region based on factors such as installed infrastructure and natural resource endowments.
- Policies that restrict access to natural resources such as land and water, or confer high costs with respect to access to these resources or establishment of infrastructure fundamentally limit the ability of regions to respond.
- Concentrating regional development policies on economic activities where regions have a comparative advantage will, all else equal, provide the best chance of fostering growth and prosperity.
- Periods of population stagnation or moderate decline that occur after an expansion phase, occur in a regional economic and social environment substantially more robust than it was prior to the expansion. This is because production capacity has been increased, additional infrastructure has been created or new knowledge/technology developed that will inform future development.
- Policies designed to give effective transition from the mining investment boom in the Kimberley Region should focus more on addressing access, tenure and logistic to pave the way for diversification in sectors in which the Kimberley has the basis for comparative advantage, as well as improve opportunities for the development of its resource endowments
- Policy settings that should be applied to the Pilbara, should focus on preserving its existing comparative advantage as opportunities for diversification of the Pilbara economy are more limited.
- FIFO is a matter of choice for resources sector workers – choice about where they work and where they live.
- Geographic labour mobility is a 'win-win', combining regional development and commercial benefits.

- Indirect benefits of FIFO occur from:
    - those doing FIFO spending their wages and salaries in the regional communities in which they live;
    - payments by companies of airport fees and charges and purchases from local suppliers;
    - support by companies for community programmes and events in communities in which their employees live.

Context

In December 2016, the Productivity Commission (the 'Commission') invited public submissions with respect to the Terms of Reference issued to it by Hon. Scott Morrison, MP, Treasurer, Australian Government, pertaining to the Commission's study, *Transitioning Regional Economies* (the 'Study').[1]

The purpose of the Study is to: '*examine the regional geography of Australia's economic transition, since the mining investment boom, to identify those regions and localities that face significant challenges in successfully transitioning to a more sustainable economic base and the factors which will influence their capacity to adapt to changes in economic circumstances*.'

The specific Terms of Reference for the Study are as follows:

1. Identify regions which are likely, from an examination of economic and social data, to make a less successful transition from the resources boom than other parts of the country at a time when our economy is reconciling the impacts of globalization, technological and environmental change.
2. For each such region, identify the primary factors contributing to this performance. Identify distributional impacts as part of this analysis.
3. Establish an economic metric, combining a series of indicators to assess the degree of economic dislocation/engagement, transitional friction and local economic sustainability for regions across Australia and rank those regions to identify those most at risk of failing to adjust.
4. Devise an analytical framework for assessing the scope for economic and social development in regions which share similar economic characteristics, including dependency on interrelationships between regions.
5. Consider the relevance of geographic labour mobility including Fly-In/Fly-Out, Drive-In/Drive-Out and temporary migrant labour.
6. Examine the prospects for change to the structure of each region's economy and factors that may inhibit this or otherwise prevent a broad sharing of opportunity, consistent with the national growth outlook.

The prologue to the Study's Terms of Reference makes several observations that are important context for the Study:

1. *'The transition from the mining investment boom to broader-based growth is underway*';
2. '*By its nature, the geography of our economic transition will not be consistent across the country…the different impacts across the geographic regions of the Australian economy occur because of variable factors such as endowments of natural resources and demographics'; and*
3. *'Some regions may also have limited capacity to respond to changes in economic conditions; for example, due to different policy or institutional setting'*.

Understanding what these observations actually mean is important context for responding to the specific terms of reference.

[1] http://www.pc.gov.au/inquiries/current/transitioning-regions

Transition from the mining investment boom to broader-based growth is underway

It is important to stress the extraordinary level of economic activity experienced by regions of Australia that host *in situ* mineral and petroleum resources over the past decade was in fact, driven primarily by mining investment, rather than mining operations. It is equally important to understand there are effectively three types of mining investment that occurred during this period:

1. Some regions such as the Pilbara Region of Western Australia were the subject of numerous multi-billion dollar investments in new resources industry capital creation in the form of new projects and project expansions that enjoy comparative advantage, and in some cases, absolute advantage in established, large and expanding regional markets for mineral and energy commodities. These investments will provide those regions with an economic and employment base for decades to come, largely irrespective of commodity market cycles.
2. Some regions host known mineral resources that as a result of high cost structures are only economically viable in times of relatively high commodity prices. An example of this is the iron ore industry in the Kimberley Region of Western Australia, where during the peak of the recent iron ore price cycle, three separate iron ore mines in the Kimberley accounted for an estimated approximate 30 percent of Gross Regional Product (GRP). Primarily as a result of lower iron ore prices[2], each of these mines is now in care-and-maintenance.
3. Some regions, rather than hosting known economic resources, are highly prospective for mineral and/or petroleum resources, but relatively under-explored because of relatively high exploration costs and/or accessibility challenges. When specific commodity prices are relatively high, risk capital markets have a greater propensity to invest in exploration in these regions, driving a greater level of exploration activity. While this activity most certainly creates new knowledge that advances the prospects of a future resources industry in the region, in most cases there will be limited short-term flow-on benefits during a commodity cycle downturn.

As such the degree to which regional economies need to transition from the mining investment boom, and the nature of policies required to ensure optimisation of regional economies differ from region to region.

It is important to acknowledge, **while a transition is underway from a mining investment boom, the economic and social contribution of the Western Australia resources sector continues to be significant to the National, Western Australian and regional economies as a consequence of the ongoing, typically larger, operations which are a result of that mining investment boom.**

This contribution is in the form of wages and salaries, business purchases, community contributions and payments to governments and has not just been to those communities in which the resources sector has operations. The flow on effects of the resources sector can be to all parts of Western Australia through the use of regional Fly-In Fly-Out (FIFO) and where business purchases occur.

[2] One of the Kimberley iron ore mines, Cockatoo Island, is in care and maintenance primarily as the result of a geotechnical issue.

CME's unique economic contribution data shows that in 2015/16, resource activity provided a direct injection of $32 billion dollars into the Western Australian economy of which $7.92 billion was in wages and salaries. Across the state, the industry spent $19.5 billion on goods and services with more than 6,924 businesses and provided contributions to more than 886 different community organisations and charities[3].

Image 1: Summary of Key Findings from CME Economic Impact Survey

Different impacts across the geographic regions of the Australian economy occur because of variable factors such as endowments of natural resources and demographics

As highlighted above, natural resource endowments are highly variable across the Australian geography and therefore, impacts of the transition from the mining investment boom will be felt to varying degrees across the regional Australia. As suggested by the Terms of Reference, regional demographics also has some impact. However, there are numerous other factors that impact on the extent to which the transition is felt by a region, including:

- Most importantly, capacity in existing processing and logistical infrastructure;
- Regional cost structures which is a function of remoteness, relevant regulations and local economies of scale;
- Other employment opportunities; and
- Regional liveability.

Given this, **policies designed to promote diversification of regional economies post the mining investment boom, must also take into account comparative advantage of a region based on factors such as installed infrastructure and natural resource endowments**.

Some regions may also have limited capacity to respond to changes in economic conditions

Most certainly different policy and institutional settings across regional Australia mean, irrespective of comparative advantage, different regions have different capacity to respond to the transition from the mining investment boom. In particular **policies that restrict access to natural resources such as land and water, or confer high costs with respect to access to these resources or establishment of infrastructure fundamentally limit the ability of regions to respond**.

[3] The suite of CME fact sheets on the economic contribution of the industry can be located at www.cmewa.com/economic-contribution

This is particularly the case as most opportunities for diversification in regional Australia are in sectors that are natural resource dependent such as pastoral agriculture, irrigated agriculture, aquaculture and tourism.

The criticality of comparative or absolute economic advantage in regional development

There has been a worrying trend in some Australian regional development policy of recent years to propose diversification of regional economies into areas where specific regions do not demonstrate the fundamental foundations of economic competitive advantage.

In the absence of (and often in the presence of) significant sustained public sector intervention in the form competition policy that favours the target at the expense of competitors, the diversification of an economy will usually only occur where the development of the new industries are able to enjoy sustainable competitive advantage that is underpinned by a region's comparative or absolute advantage with respect to that industry.

Absolute and/or comparative advantage are the fundamentals of competition that entrepreneurship is able to convert into a sustainable competitive advantage. These basic elements of competitive advantage are summarised in Table 1 below.

Basis of Sustainable Competitive Advantages	Definition
Absolute Advantage	Absolute advantage is the ability of an individual, company, region or country to produce a good or service at a lower per unit cost that the cost at which any other entity produces that good or service.
Comparative Advantage	Comparative advantage refers to the ability of an individual, company, region or country to produce goods or services at a lower opportunity cost than other entities, where opportunity cost refers to the cost of an alternative that must be foregone in order to pursue a certain actions (i.e. the benefits that could be accrued by pursuing an alternative course of action).
Entrepreneurship	Entrepreneurship refers to the ability to strategically, tactically and operationally marshal economic resources in order to convert absolute and/or comparative advantage into rent producing enterprise that remains competitive on a sustainable basis.

Table 1– Fundamentals of Sustainable Competitive Advantage

While enterprise can certainly be established and enter a market in the absence of having absolute or comparative advantage in that market, that enterprise will not be able to create or sustain medium to long-term (sustainable) competitive advantage and will ultimately falter.

The importance of absolute or comparative advantage is recognised by the Western Australian Regional Development Trust.

In July 2011, the Western Australian Minister for Regional Development requested each of the State's nine regional development commissions to prepare a regional blueprint document. In commissioning the exercise, it was intended the regional blueprints would serve to outline aspirational growth and development strategies for the State's nine regions.

From the outset of the blueprint preparation exercise, the intent has been that blueprints are to provide a locally-informed evidence base for investment and resourcing decisions to support regional economic development.

On review of the Regional Blueprint's prepared by the Regional Development Commissions in Western Australia, and following the strategic advice received from ACIL Allen, the Trust identified comparative and competitive analyses provide valuable tools by which to ascertain the relative strengths of the regions and identify Government investment opportunities. The development of a more comprehensive understanding of the comparative and competitive

positions of our regions should be a priority objective for the Department of Regional Development (DRD) [4].

The assessment undertaken by ACIL Allen on a collective review of regional blueprints and implications for a regional development strategy is a useful reference.

The main implication to arise out of the review of identified comparative advantages is that there would be value in an evidence-based and truly comparative (i.e. cross-regional) assessment of the comparative advantages in terms of the economic activities of each of the State's regions. This is important because by **concentrating regional development policies on economic activities where regions have a comparative advantage will, all else equal, provide the best chance of fostering growth and prosperity**.

Response – Specific Terms of Reference

This response is confined to Terms of Reference 1, 2, 5 and 6, as set out in Table 2 below.

Term of Reference	Description
1	Identify regions which are likely, from an examination of economic and social data, to make a less successful transition from the resources boom than other parts of the country at a time when our economy is reconciling the impacts of globalization, technological and environmental change.
2	For each such region, identify the primary factors contributing to this performance. Identify distributional impacts as part of this analysis.
5	Consider the relevance of geographic labour mobility including Fly-In/Fly-Out, Drive-In/Drive-Out and temporary migrant labour.
6	Examine the prospects for change to the structure of each region's economy and factors that may inhibit this or otherwise prevent a broad sharing of opportunity, consistent with the national growth outlook.

Table 2 – Terms of Reference Responded To

This submission addresses the specific Terms of Reference listed in Table 2 above by comparing the impact of the transition from the mining investment boom of the past decade on two regions of Western Australia that host both mineral and petroleum sectors, the Pilbara and Kimberley Regions. These two important regions of Western Australia have been selected because, while they are vastly different in terms of scale of resources industry, they both:

- Have historical and contemporary production of minerals and petroleum;
- Host known un-developed resources
- Have been the subject of new resources industry capital creation over the past decade;
- Have mineral and petroleum industries that are of similar sectorial composition;
- Are remote and therefore both face the various challenges associated with project construction and operations in remote Australia; and
- Exhibit harsh climates.

However, by virtue of regional comparative advantage, the extent to which the two regions need, and are able, to respond to the current mining investment environment, are quite different.

Due to the short timeframe provided in which to lodge a submission consideration was not able to be given to the remaining resource regions in the state in this comparison.

Geographic labour mobility, including Fly-In/Fly-Out is also considered separate to this.

[4] http://www.drd.wa.gov.au/Publications/Documents/WARDT_Review_of_the_Regional_Blueprints.pdf

The Pilbara Region of Western Australia

The Pilbara Region of Western Australia is home to approximately 66,000 people and has a Gross Regional Product of approximately $27.9 billion.

Up until to the commencement of the second half of last century, the 502,000 square kilometres of the Pilbara landmass had been the subject of very limited industrialisation and as a result, was very sparsely populated.

The commercialisation of vast iron ore resources that commenced in the 1960s, and subsequently, offshore petroleum resources in the 1970s, have been, and remain, the principal, if not the only, driver of population growth in the Pilbara Region. Development of the Pilbara Region since the late 1950s can be broadly delineated into periods that are defined by significant developments in the Pilbara iron ore and petroleum industries, implementation of policy that has facilitated those developments, as well as urban developments that have been undertaken to support those resources industry projects. These periods are summarised in Table 3 below.

Period	Description
A: 1950-1962	**Discovery of Iron Ore in the Pilbara and Iron Ore Policy Reform** Identification of significant iron ore mineralisation in the Pilbara Region and Federal and State policy reform that rendered iron ore production from the Pilbara Region commercially viable.
B: 1963 -1969	**First Wave of Iron Ore State Agreements, Iron Ore Project Construction, First Iron Ore Production and First Offshore Commercial Oil Discovery** Execution of five separate agreements between the Western Australian Government and iron ore project proponents ('State Agreements') that provided a framework that governs the development and operations of mines, infrastructure and towns; construction of first iron ore transport and export infrastructure; commencement of first iron ore production; and construction of first iron ore oriented town. The first discovery of offshore petroleum reserves was also made during this period.
C: 1970 – 1972	**Second Wave of Iron Ore State Agreements, Further Iron Ore Infrastructure Construction and Establishment of Iron Ore Town Sites** Execution of a further five State Agreements pertaining to iron ore projects; construction of additional port-side iron ore infrastructure; and gazetting of the towns of Newman, Wickham, Paraburdoo and Pannawonica. These towns were established primarily to support the development of the iron ore industry.
D: 1973-1978	**Limited Development** Major development was limited to government investment in upgrading existing roadways connecting southern parts of the State to main centres in the west and east Pilbara.
E: 1979-84	**First Gas State Agreement and First Gas Production** Execution of a State Agreement governing the development and operation of the North West Shelf Project, associated infrastructure and towns. First offshore gas production also occurred during this period.
F: 1985-1994	**Third Wave of Iron Ore State Agreements and Significant Expansion** Execution of a further five State Agreements pertaining to iron ore projects and development and first production from five new iron ore mines.
G: 1995-2000	**Second Offshore Gas Platform Commissioned** First production from the second offshore gas platform.
H: 2000-2010	**Fourth Wave of Iron Ore State Agreements, New Iron Ore Entrants and Second State Agreement Pertaining to an Offshore Petroleum Project** Execution of four additional iron ore State Agreements, all with new entrants to the Pilbara iron ore industry; construction and first production from seven new iron ore mines; significant expansion of iron ore transport and export infrastructure; second gas State Agreement; and Second LNG Project commissioned.
I: 2011-15	**New Iron Ore Project and Second LNG Plant Commissioning** Three new iron ore projects and one additional LNG Plant commissioned.

Table 3 – Key Policy, Project Development and Urban Development Events Defining the Post 1950 History of the Pilbara

As illustrated in Figure 1[5] below, the population growth pattern of the Pilbara Region has been one characterised by a period of very rapid growth followed by a period of stagnation or even decline that are closely linked to developments in its resources industry. While this is only evident over a single cycle of expansion (Periods B to E), there is no reason to suggest the decline in population that is starting to occur (Period I) will continue until the next phase of expansion, as it did during the period F to the commencement of period H.

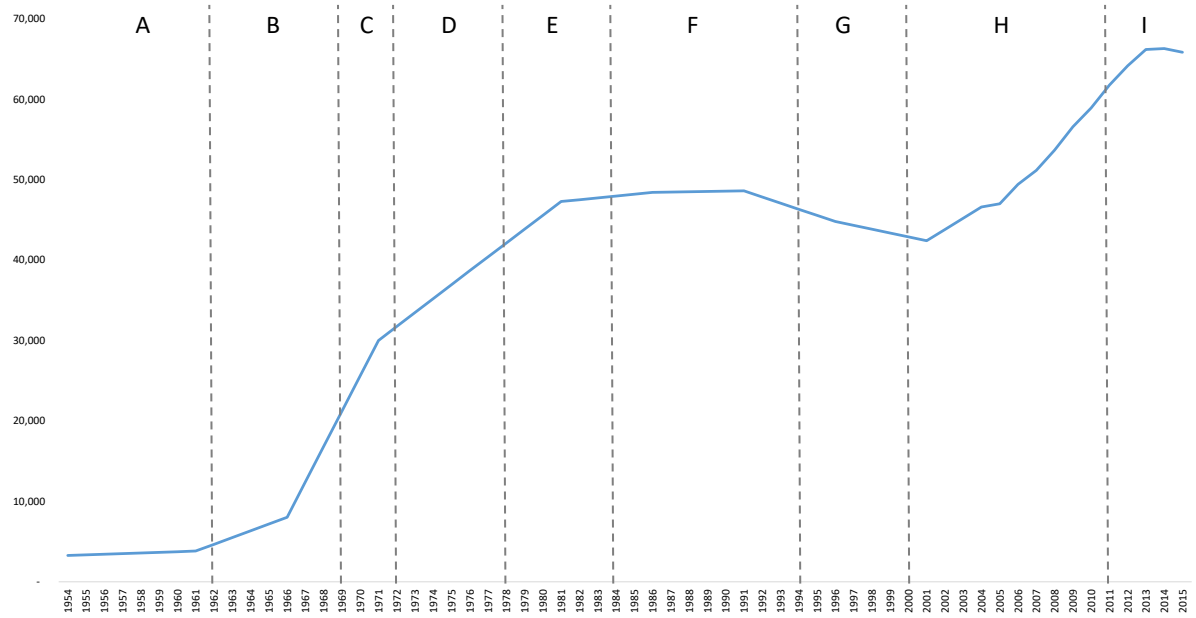

Figure 1 – Trend in the Population of the Pilbara Region (1954 to 2014) and Key Events in the Development of the Pilbara Resources Industry

The important fact to note is, that in the case of the Pilbara, **periods of population stagnation or moderate decline that occur after an expansion phase, occur in a regional economic and social environment substantially more robust than it was prior to the expansion. This is because the production capacity has been increased, additional infrastructure has been created or new knowledge/technology developed that will inform future development.**

The anecdotal observation that population growth in the Pilbara Region is substantially driven by expansion of its resources industries implies there should be a strong statistical relationship between changes in the Pilbara population and key metrics that are indicative of an expansion of its resources industries.

A correlation analysis of population trends in the Pilbara region and Western Australian resources sector new private capital creation, as well as the value of minerals and petroleum production from the Pilbara Region, demonstrates a very high portion of the changes in population over at least the past 25 years can be explained by changes in these metrics. While high statistical correlation does not necessarily imply causation between variables, in this case it is highly indicative of causation.

Over the decade preceding 2000, at total of A$32.9 billion was invested in private new capital creation in the Western Australian resources industry. Over the course of the following 15 years to 30 June 2015, a total of A$320.5 billion was invested in new private capital creation in the Western Australian resources industry, representing an almost 10-fold increase. The vast majority of this investment is associated with the Pilbara projects listed in Figure 2 below.

[5] Australian Bureau of Statistics Census 1954 to 2011, extrapolated for interim years AND *Australian Bureau of Statistics (2016), Estimated Residential Population, Local Government Areas, Western Australia*, Cat. 3218.0, Australian Government, Canberra.

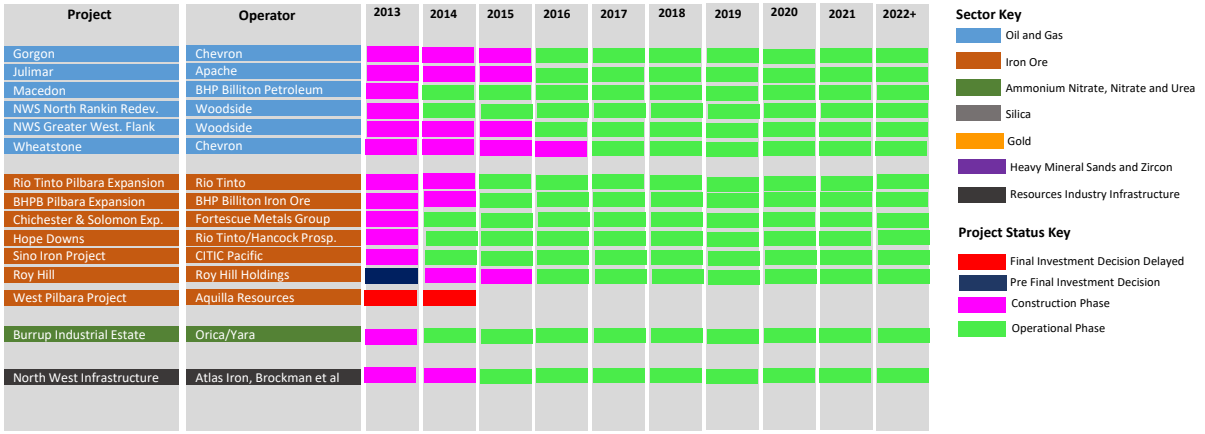

Figure 2 – Status of Major New Pilbara Resources Projects

Figure 3 below illustrates the trend in total Pilbara population[6] and the value of minerals and petroleum production from the Pilbara Region since 1990[7]. Again, it illustrates a very strong observational relationship, noting Western Australian Industry New Capital Creation and the Value of Pilbara Minerals Production are, of course, dependent variables.

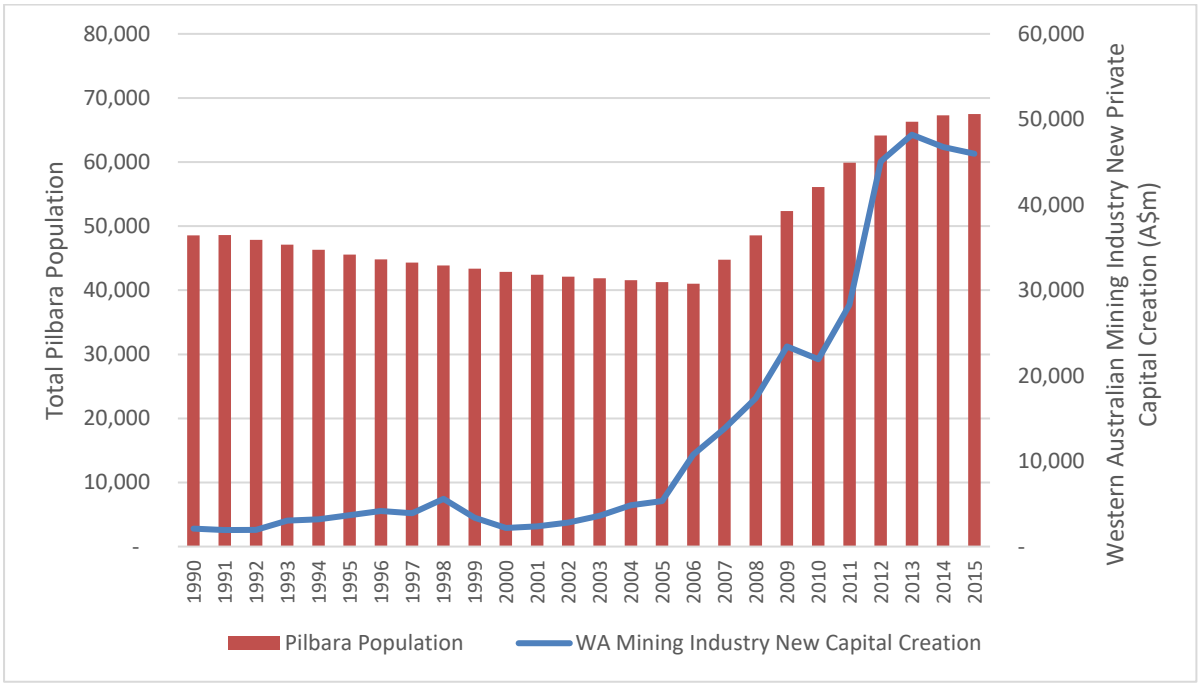

Figure 3 – Total Pilbara Population and Western Australian Mining Sector New Private Capital Creation (1990 to 2015)

[6] Australian Bureau of Statistics Census 1954 to 2011, Australian Bureau of Statistics Pilbara Population estimates 2012 to 2014.

[7] Department of Mines and Petroleum, Western Australian Minerals and Petroleum Statistics Digests 1990 to 2014, Western Australian Government, Perth

Figure 4 below illustrates the trend in total Pilbara population[8] and the value of minerals and petroleum production from the Pilbara Region since 1990[9]. Again, it illustrates a very strong observational relationship, noting Western Australian Industry New Capital Creation and the Value of Pilbara Minerals Production are, of course, dependent variables.

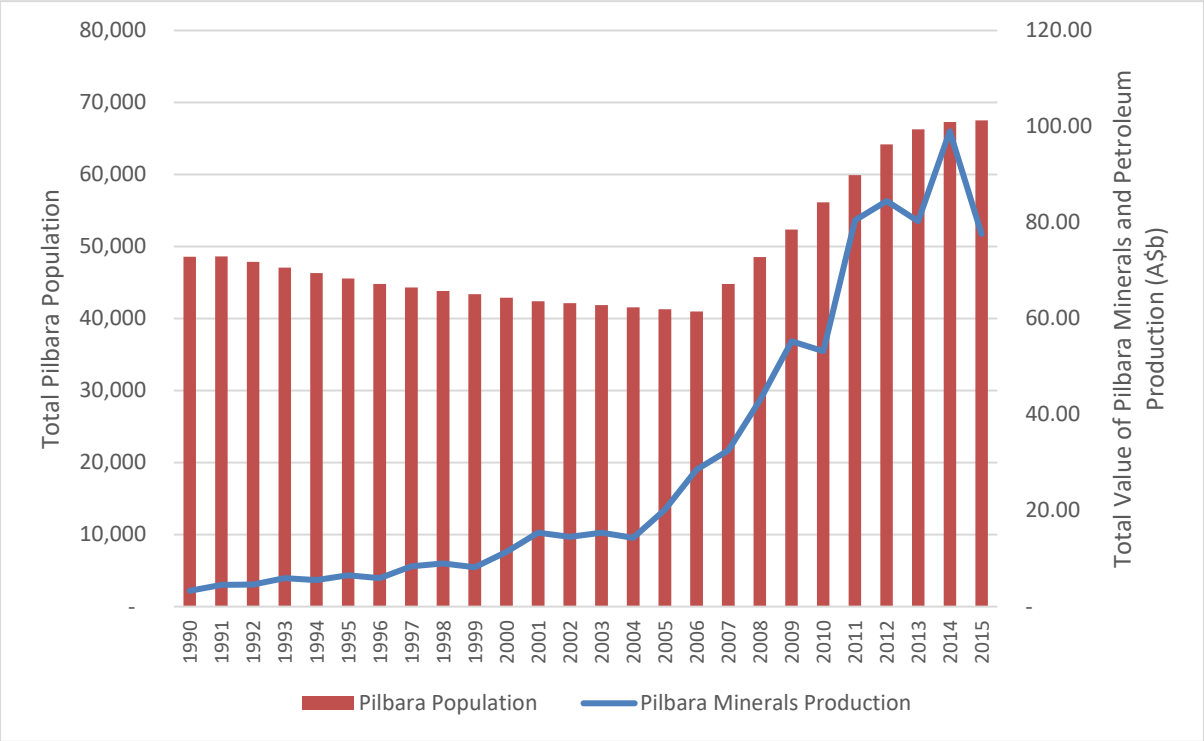

Figure 4 – Total Pilbara Population and Value of Minerals and Petroleum Production from the Pilbara (1990 to 2015)

Correlation analysis of the data illustrated in Figure 3 and Figure 4 above indicates between approximately 90 and 95 percent of the changes in population the Pilbara Region as a whole, in the Port Hedland Local Government Area (LGA) and Roebourne LGA can be explained by changes in Western Australian mining sector new capital creation and changes in the value of minerals and petroleum production from the Pilbara region. While the relationship is not as strong in the Ashburton and East Pilbara LGA's, it is significant. The statistical relationship between these variables is summarised in Table 4 below.

	Western Australian Mining Industry New Capital Creation (r^2)	Value of Pilbara Region Minerals and Petroleum Production (r^2)
Pilbara Region	0.94	0.89
Port Hedland LGA	0.93	0.89
Roebourne LGA	0.97	0.96
Ashburton LGA	0.72	0.64
East Pilbara LGA	0.80	0.75

Table 4 - Correlation Between Western Australian New Mining Industry Capital Creation and Value of Pilbara Region Minerals and Petroleum Production with Populations in the Pilbara Region

[8] Australian Bureau of Statistics Census 1954 to 2011, Australian Bureau of Statistics Pilbara Population estimates 2012 to 2014.

[9] Department of Mines and Petroleum, Western Australian Minerals and Petroleum Statistics Digests 1990 to 2014, Western Australian Government, Perth

The petroleum and iron ore sectors have accounted for the vast majority of value of resources industry production in the Pilbara Region for the past 30 years.[10] This is illustrated in Figure 5.

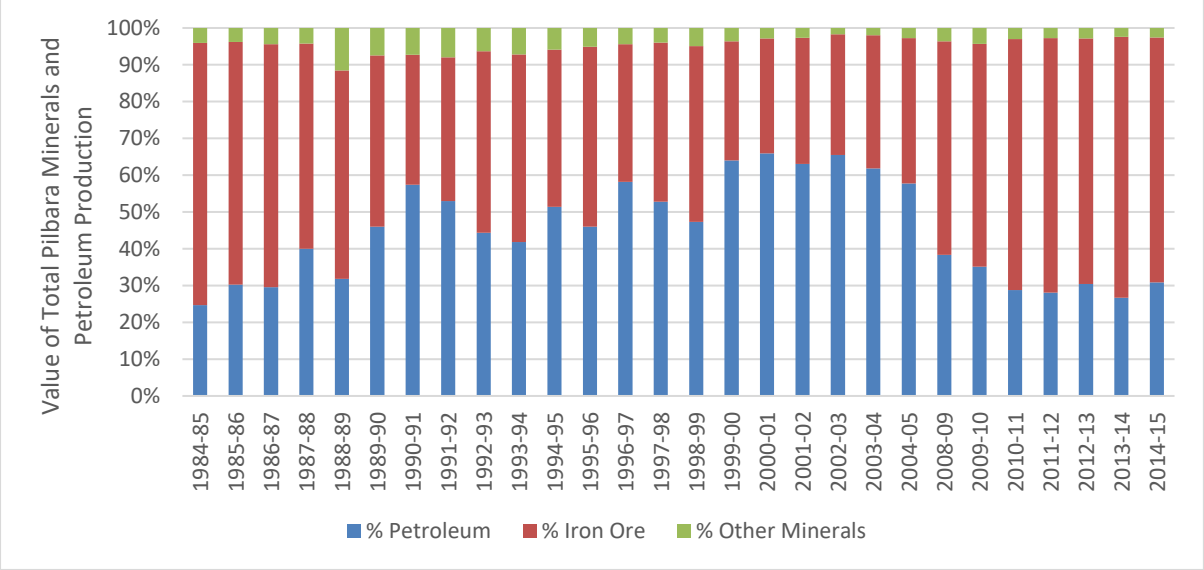

Figure 5 - Sector Contributions to the Value of Pilbara Minerals and Petroleum Production

It is estimated approximately 60 percent of jobs in the Pilbara Region are in the mining and related construction sectors. [11]

While there are other projects planned for the Pilbara region that are as yet to pass Final Investment Decision, recent trends in key commodity prices and the outlook in the market for those commodities suggests that at the very least, the pace and intensity of new project investment will decrease substantially.

If one accepts the primary determinant of population dynamics in the Pilbara Region is and remains the expansion of its iron ore and petroleum industries; that in terms of existing resources industry construction projects, the region is passing through peak construction; and the structural adjustments in the global markets for iron ore and LNG will result in softer prices for the foreseeable future resulting in at least a slower pace and intensity of new iron ore or petroleum project development, the only conclusion that can be formed is that in the absence of a new driver of significant employment opportunities in the Pilbara, the population of the Pilbara will enter a period of stagnation and possible decline. As per 'Period I' in Figure 1, this would appear to be the immediate trend.

The prospects for the Pilbara entering into a new pattern of economic and population growth is likely to be restricted. Most certainly, government driven development plans have identified potential growth opportunities in areas such as:

- Marine and resource engineering and supply chains
- Innovation and advanced technology;
- Agriculture and aquaculture;
- Renewable energy; and
- Tourism

However, the Pilbara Region demonstrates limited, if any, comparative or absolute advantage in these sectors. While there is currently some limited economic activity in each of these

[10] Department of Mines and Petroleum, Western Australian Minerals and Petroleum Statistics Digests 1990 to 2014, Western Australian Government, Perth

[11] Australian Bureau of Statistics (2011), *Census 2011*, Australian Government, Canberra

sectors in the Pilbara, the sustainable, significant expansion in any of these sectors in the Pilbara is unlikely.

The Pilbara Region does however, have demonstrated absolute and comparative advantage in the regional market for the production and supply of iron ore to the regional steel manufacturing industry, as well as high quality salt to the regional chloro-alkali industry, and has comparative advantage, possibly trending toward absolute advantage in the production and supply of LNG to regional energy markets.

The Pilbara's Absolute and Comparative Advantage in Regional Iron Ore Markets

Iron ore operations in the Pilbara Region currently produce and export to Asian steel mills approximately 800 million tonnes of iron ore, accounting for just under 50 percent of global iron ore exports. This is illustrated in Figure 6[12] below.

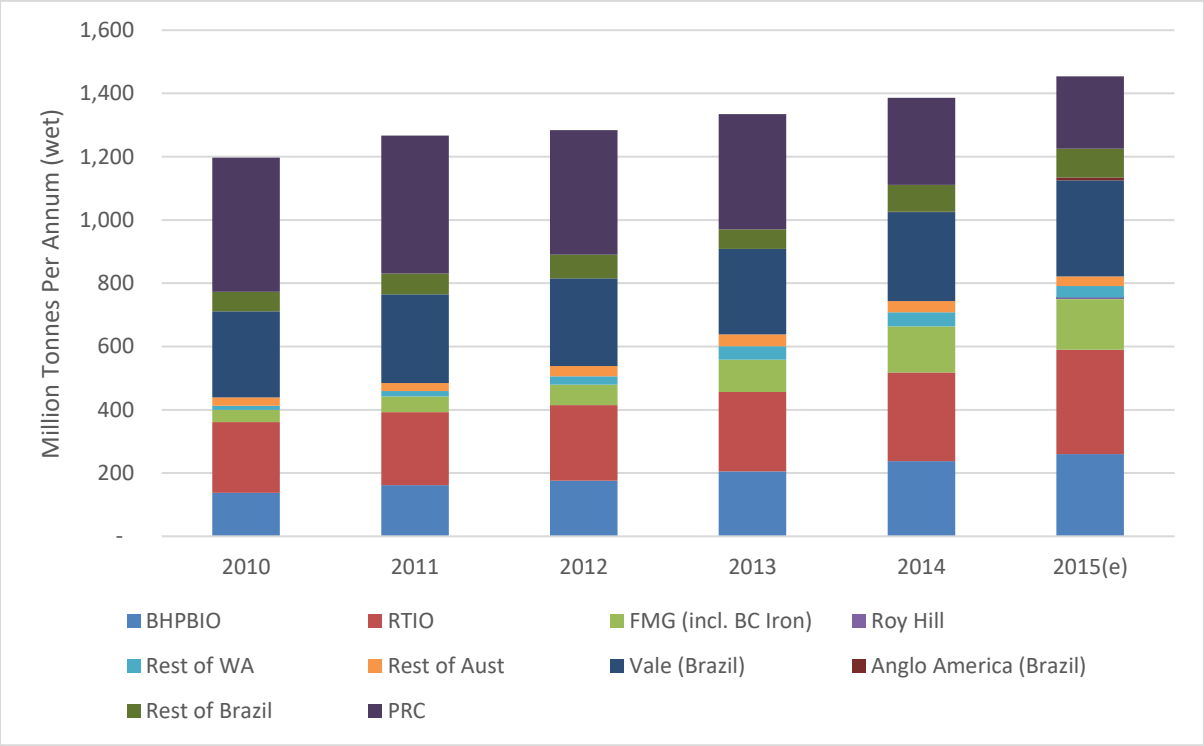

Figure 6 – Growth in Global Supply of Iron Ore

In the case of iron ore, absolute and comparative advantage in the regional market for iron ore is evidenced by the position of major Pilbara iron ore producers on the global cost curve. This is illustrated conceptually in Figure 7 below. The vast majority of iron ore production from the Pilbara is produced at the lowest cost in the world, providing it with absolute advantage. While Brazilian iron ore is characterised by low production cost, its distance from Asian steel mills limits its ability to effectively compete with most Pilbara production in those markets.

Pilbara iron ore production obviously also has comparative advantage with respect to its trading partners, with other Asian produced iron ore characterised by substantially higher production costs.

[12] Wood Mackenzie IN: BHPBIO Slide presentation

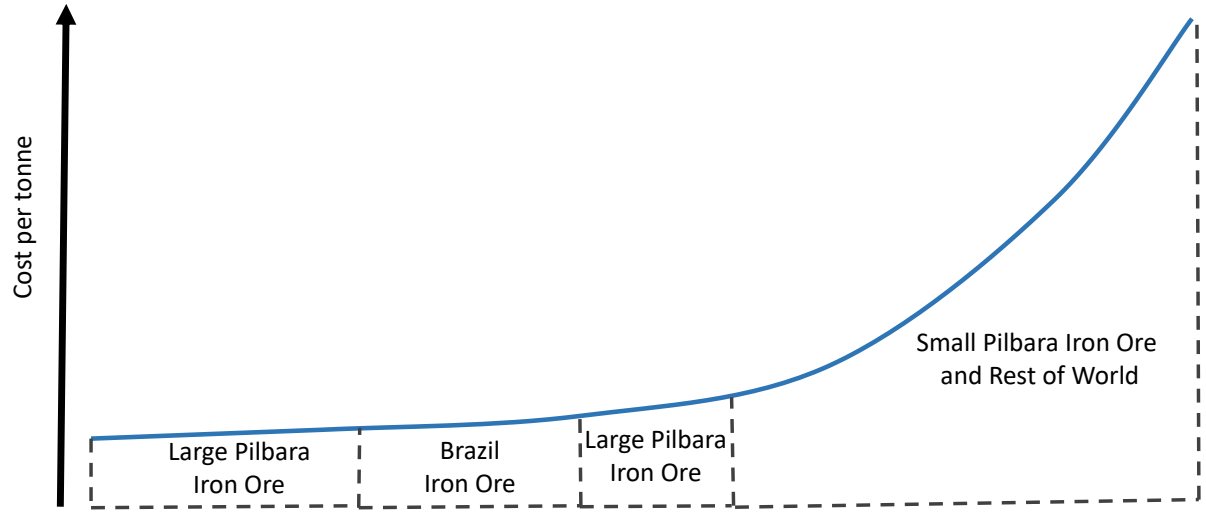

Figure 7 – Conceptual Iron Ore Cost (Supply) Curve

The Pilbara Region's absolute and comparative advantage in the supply of iron ore to regional steel manufacturing markets is founded in the combination of the following:

- Extensive known deposits of at or near surface, high grade iron ore;
- Proximity to Asian steel mills;
- Significant private sector investment over the course of decades in establishing infrastructure that facilitates low-cost extraction, processing and distribution of these resources; and
- Government policy that has created an environment where investment in this infrastructure is commercially competitive.

The Pilbara's Absolute and Comparative Advantage in Regional Salt Markets

There are currently four solar salt projects located on the north Western Australian coast, two of which are located in the Pilbara Region, and two which is located just south of the Pilbara Region near Shark Bay. The two Pilbara projects are the larger of the operations and have a combined production and export capacity of approximately 7.4 million tonnes per annum.

This production is exported primarily to customers in the chloro-alkali industries of the People's Republic of China (PRC), Japan, Republic of Korea (ROK) and Taiwan, who use the salt as an input to the production of products such as caustic soda, chlorine and soda ash. The only substantive competitor to Western Australian production in these markets is Exportadora del Sal in Mexico, which operates the largest salt-field in the world, producing approximately 8 million tonnes per annum. Other sources of supply from the PRC and India, are lower quality and generally not suitable for use in ion exchange membrane technology which has progressively replaced the mercury and diaphragm processes as the mainstream process in the Asian chloro-alkali industries.

While the contribution to Pilbara Gross Regional Product from salt production is substantially less than that of its iron ore and LNG industries, salt exports from the Pilbara demonstrate comparative advantage in the Asian chloro-alkali industry markets.

The Pilbara's Comparative Advantage in Regional LNG Markets

LNG operations in the Pilbara region currently export approximately 20.6 million tonnes per annum of LNG to regional energy markets. As new projects come on stream within the next 24 months, this will increase to a total capacity of 48.7 million tonnes per annum.

While it is less clear as to whether aspects of the Pilbara LNG industry possess absolute advantage in its markets, there is a potential trend toward this evident in the LNG cost curve illustrated in Figure 8[13] below. Provided the North West Shelf and new LNG projects are able to further drive down costs, this may indeed eventuate, particularly with respect to large volume regional LNG markets. Nevertheless, large volumes of Pilbara LNG production clearly demonstrate comparative advantage in regional LNG markets, with the North West Shelf Project being among the lower cost high volume LNG producers in the region.

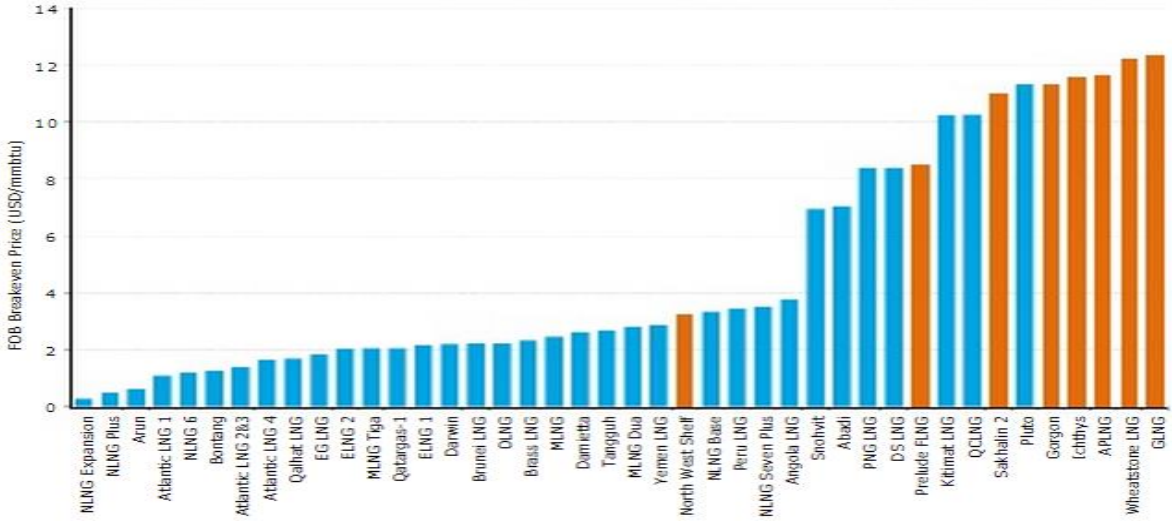

Figure 8 – Global LNG Cost Curve

Periodic expansions of the Pilbara resources industry result in a new, order of magnitude scale of production that by virtue of the Region's comparative and absolute advantage is sustained for long periods, delivering significant economic and social benefits to the Region. The Pilbara has limited, if any comparative advantage in other sectors such as agriculture, aquaculture, tourism or manufacturing.

As such, for a region like the Pilbara, policy designed to optimise the transition from the mining investment boom should focus more on ensuring high levels of productivity in operations, optimising social and economic benefits for the local community that are derived from those operations and ensuring that the local economy and community are optimally positioned to benefit from the next phase of expansion. Diverting resources from these efforts toward diversification strategies that are not underpinned by comparative or absolute advantage represents poor allocation of limited development resources.

[13] Wood McKenzie

The Kimberley Region of Western Australia

Bordering the north of the Pilbara Region, with its main centre of Broome approximately 600 kilometres to the north-east of Port Hedland, the Kimberley Region is home to approximately 40,000 people, and has a GRP of approximately $3.4 billion.[14]

In recent history, the Kimberley minerals and petroleum industry has included offshore and onshore petroleum exploration, development and production, iron ore production and exploration, mineral sands exploration, nickel production, gold production, diamond production and rare earths exploration and development. In 2013, the sector accounted for an estimated 35 percent of the Kimberley's GRP. Table 5 below summarises the current status of the main Kimberley minerals projects that are at an advanced development or production stage.

Commodity	Project	Proponent	Status
Iron Ore	Ridges	KMG	Care & Maintenance
Iron Ore	Koolan Island	Mount Gibson	Suspended
Iron Ore	Cockatoo Island	Pluton Resources	Care & Maintenance
Iron Ore	Irvine Island	Pluton Resources	Pre Development
Gold	Halls Creek Project	Pantoro Limited	Operational
Gold	Tanami	Tanami Gold	Operational
Nickel	Savanah	Panorama Resources	Care & Maintenance
Diamonds	Argyle	Rio Tinto	Operational
Mineral Sands	Thunderbird	Sheffield	Pre development
Rare Earths	Browns Range	Northern Minerals	Pre development

Table 5 – Current Status of Advanced and Operational Kimberley Minerals Projects

Of particular note is that the three iron ore mines are currently either suspended or in care and maintenance, accounted for the vast majority of the industry's contribution to GRP and regional employment over the past decade.

Table 6 below, lists the main onshore and offshore petroleum sector projects in the Kimberley Region.

Commodity	Project	Proponent	Status
LNG & Condensate	Ichthys	INPEX	Construction
LNG & Condensate	Prelude	Shell	Construction
LNG & Condensate	Browse	Woodside	Pre development
Natural Gas	Black Tip	ENI	Care & Maintenance
Natural Gas & Oil	Ungani, Valhalla, Asgard & Yulleroo	Buru Energy	Exploration & Development
Natural Gas & Oil	Canning Basin	Hess Corporation	Exploration

Table 6 – Main Kimberley Onshore and Offshore Petroleum Projects

[14] Kimberley Development Commission

The Kimberley's main economic exposure to the Ichthys, Prelude and Browse projects has been supporting marine and aviation services associated with offshore exploration and development activities associated with those projects. With Ichthys and Prelude shortly transitioning to an operational phase, the majority of marine services associated with those projects will be serviced out of Darwin, and with respect to Browse, future development is currently under review. Similarly, exploration and development activity associated with prospects in the onshore Canning Basin has declined substantially, with only one company, Buru Energy, actively developing a single project, Ungani.

Compared to the Pilbara Region, where the recent mining investment boom has resulted in a much larger, sustainable production base, the transition from the mining investment boom for the Kimberley will likely be felt far more acutely. This is because the mining investment that took place in the Kimberley was skewed more toward the type that commissions high cost operations that are only viable with high commodity prices, or that which is focused on exploration and early stage development. All of this investment has left the Kimberley resources industry more advanced and more ready for a future expansion phase, but it has not transitioned to a critical mass of production capacity.

However, unlike the Pilbara, the Kimberley has the basis of comparative advantage in other sectors. For example:

- The Kimberley Region is a nationally and globally recognised tourism destination. This is based primarily on its dramatic landscapes and wilderness attributes and Aboriginal culture. There is some established tourism infrastructure and the Region is serviced by RPT connectivity to major Australian hubs, as well as the cruiseliner sector.
- The pastoral sector of the Kimberley hosts the State's largest herd of cattle. In the case of many operations there is opportunity to improve stocking rates. While most production from the Region is currently destined for the live-export market, the recent commissioning of a local abattoir has opened opportunity for value-added beef production from the Region.
- The existence of large scale irrigation resources and infrastructure in the north east of the Kimberley is continuously expanding, opening opportunity for production of a range of horticulture and crop products. Furthermore, the proving up of ground and other water resources across the southern and west Kimberley presents opportunity for further irrigated horticulture and cropping, as well as the production of pastures for intensive grazing purposes.
- The declaration of the Kimberley Aquaculture Development Zone by the Western Australian Government has provided a pathway for the expansion of the Regions marine finfish aquaculture sector.

However, all of these opportunities for diversification in the Kimberley are challenged by complex land tenure and land and resource access arrangements, and critically deficient logistics (particularly hinterland logistics).

As such, **policies designed to give effective transition from the mining investment boom in the Kimberley Region should focus more on addressing access, tenure and logistics to pave the way for diversification in sectors in which the Kimberley has the basis for comparative advantage as well as improve opportunities for the development of its resource endowments.**

This differs dramatically from the **policy settings that should be applied to the Pilbara, which should be more focused on preserving its existing comparative advantage, as opportunities for diversification of the Pilbara economy are more limited.**

Geographic Labour Mobility

'Long distance commuting', including Fly-In/Fly-Out (FIFO) as its most recent manifestation, has a long history in WA. It could be argued the arrangements whereby shearing teams recruited in Perth and travelling from sheep stations in the Kimberley south through the pastoral areas in the first half of the 20th century were an early form of this workforce management practice.

Early construction of the iron ore mining and shipping facilities in the Pilbara in the 1960s and 1970s was undertaken by gangs of specialist labour recruited from outside the region who were housed in temporary camps. At the completion of construction, some of these workers took permanent jobs in the region, but most returned home. Similarly, the development of the North West Cape Naval Communications Facilities in the 1960s and the associated construction of the Exmouth town-site were done by workers housed in temporary accommodation.

The new towns built to service the mining industry in the 1960s and 1970s were located immediately adjacent to the major resources (e.g. Tom Price and Mt Tom Price, Newman and Mt Whaleback, Leinster and Leinster Nickel Operations) and the port facilities (e.g. Dampier and Dampier Port, Wickham and Cape Lambert). Some towns that were located near resources that have become exhausted have subsequently been removed entirely – such as Goldsworthy and Shay Gap. This history of short term settlement and then abandonment of mining towns is not new – as the legacy of abandoned towns from the early 1900s in the Goldfields shows (e.g. Kanowna, Niagara, Kurrajong, Lawlers etc).

In other instances, some resource company established towns have since become 'normalised' as the communities have become more diversified, either with more than one resource company operating in the area or through different industries. Where this type of diversification hasn't occurred to a large degree, the towns have remained partially 'closed' such as Leinster.

FIFO evolved into its current form to break from the expensive (to both government and industry) and socially challenging process of town construction and then abandonment – or rapid expansion and then slow contraction (as in Nullagine, Yalgoo etc). It has also developed to compensate for the increased urbanisation of Australia, a trend that has been in place for more than a century. Census data shows in 1921, the population living in metropolitan Australia increased from 43 per cent to almost 70 per cent in 2006.

With most resource projects operating or under development in regional and remote Australia, resource companies are working against this long term trend in sourcing a skilled workforce. The importance of FIFO for resource projects is recognised nationally, where mobility in the workforce is required to service projects.

FIFO and residential employment are complementary, not supplementary approaches in a total workforce management package, with the mixture of employment type governed by the individual's circumstances and lifestyle choices.

The percentage increase in FIFO employment over the last 10 years has been driven by a tighter and more competitive labour market, increasing volatility in the resources sector, increased disparity between the relatively large construction workforces and smaller operational workforces in new projects, and increased dispersion of resources operations. FIFO employment offers companies and individuals the spatial and temporal flexibility necessary to develop these resources profitably and in a sustainable way.

Workforce models vary between company to company, site to site and depend greatly upon what stage each project is at – construction, operational, maintenance or shut-down. Each of these workforce models will require different skill sets and different accommodation options at different times.

The demand and supply of suitably qualified personnel has created in WA a skilled labour market that is reliant upon flexibility and adaptability. Over time the industry has developed an employment model to attract and retain its skilled workforce in the safest and most competitive manner. The workforce model is a combination of residential and FIFO.

In WA, the majority of resource operations are remotely located without a nearby regional centre. In this environment, providing employees with choice is paramount. Choice of what job they do, who they work for and importantly of where they choose to live. Employees cannot be forced to live in regional or remote locations if they don't choose to do so. FIFO enables employees to work in an industry or region and live where they choose.

In mid-2015 The Chamber of Minerals and Energy of Western Australia partnered with independent global research firm Ipsos to undertake a survey to collect data on the Western Australian resources sector workforce to capture information on demographics, preferences, satisfaction and wellbeing.

The survey targeted those working FIFO, those working residential on site and those who are residential in the Perth metropolitan area. After a data collection period across May/June 2015, 2,513 electronic surveys and 90 paper copies were completed, a sample size of 2,603 – approximately 2.7% of the Western Australian resources sector workforce. The composition of responses included 1,393 FIFO workers, 518 residential regional workers and 688 residential metro workers.

The survey identified clear workforce preferences by individuals:

- 74% of FIFO workers would not continue in their role if their arrangement changed to residential. The main reasons for this were around not wanting to live regionally, family reasons (school availability, partner's career limited etc.) and lack of infrastructure in the regions.
- Both financial incentives and lifestyle emerged as the two most important reasons for resources sector employees' choice of role across the three work arrangements.
- This suggests resources sector workforces are not necessarily trading off lifestyle for financial gain; rather that it is possible to get both from the three different work arrangements depending on personal circumstances.

Research indicates FIFO employees are largely family orientated individuals with 70% of FIFO employees being in relationships with children.[15] These families all have their own specific needs and preferences which influence the choice people make about employment.

FIFO provides choice for families wishing to access services and amenities such as particular schools and medical facilities, by allowing some family members the opportunity to reside outside of remote locations, while benefiting from other family members working in the regions.

In addition to this, the majority of families are now in a position where both parents have careers.[16] FIFO provides the opportunity for one parent to work on FIFO arrangements and the other to remain where their career is located. This arrangement also may offer superior support options for children, including day-care and support from other family members.

FIFO is a matter of choice for resources sector workers – choice about where they work and where they live.

The contrast between large, highly mobile construction workforces employed for a short timeframe and smaller operational workforces over longer timeframes, means it is unrealistic for construction workers to be expected to take permanent residence in remote communities.

[15] Creating Communities, 2013, *FIFO Life Survey*, Creating Communities and FIFO Families August 2013
[16] The Australian Institute of Family Studies, 2013, *Parents working out work*, Australian Family Trends No. 1

The short-term nature of construction versus ongoing operations, the relatively short life of some new mines, the cost of building towns with a limited life and with no alternative economic supports, and the reality of workers seeking to make individual lifestyle choices for themselves and their families, requires that many new and expanding mines be operated by long-distance commuting workforces.

This is not a situation peculiar to WA, but is exacerbated here by the large size of the state, and the mineral rich regions being in the less populated areas. While mineral and energy development will be the most important industry in regional Australia for the foreseeable future, an increasing proportion of resource recovery will occur in locations at some distance from existing towns.

It is worth noting the desire for FIFO employment is not confined to the resources industry, with an increasing number of state and local government employees in regional WA opting for the flexibility these arrangements provide for themselves and their families. The further capital intensification of broad-acre agriculture in WA is also leading to less people being permanently resident on farms with some seeking FIFO arrangements with the resources sector to supplement their incomes.

"Source" versus "Host" Communities

The term used in this submission for a town where a FIFO workforce is housed in an existing town is termed a 'host' community. The term 'source' community is used in describing the town or city where the FIFO worker's permanent residence is located and where his/her partner and dependents live.

Several commentators have referred to the 'fly-over effect' of FIFO in taking funds from the town that is hosting the FIFO workforce. While this is partly true, it is also true FIFO workers located in an established town inject considerable funds into retail and hospitality businesses in the towns. The income spent by workers in these towns is a direct benefit to the source community.

Most FIFO employees in Western Australia live in the source community of the Perth-Peel Region. However, there has been a move to enable a broadening of economic benefit to occur, with employees living in regional centres and employed on FIFO arrangements in more remote parts of WA. Some towns participating in this approach include Broome, Carnarvon, Geraldton, Manjimup and Busselton.

The economic benefit to these regional communities can be seen through payment of wages and salaries, purchases from local suppliers, airport fees and charges and support for community programmes and events.

This revenue is sustaining local populations with indirect benefits being felt more broadly throughout those communities through flow on effects as those receiving the initial payment then seeking to purchase other goods and services and property. The consequence of this is other jobs, whether it be in the retail, hospitality or other industry sectors.

CME regards **geographic labour mobility is a 'win-win', combining regional development and commercial benefits**.

FIFO arrangements have enabled large numbers of resource sector employees and their families to obtain attractive incomes, while retaining a residential base in a preferred location. By maintaining a family base in a large regional or metropolitan centre, resource sector employees have been able to maintain employment in their industry while also ensuring they and their families are able to enjoy a good level of government and commercial services. In short, FIFO adds a 'spatial dimension' to career development, with movement between companies as opportunities present themselves, without the need to move the family base.

There is also a temporal basis to the opportunity to move from FIFO to residential employment and vice versa. It is becoming more common in some regional areas for employees to move from residential work in a small town to a period of FIFO employment to ensure their children

have access to a preferred secondary and tertiary education in a metropolitan centre. Conversely, there is anecdotal evidence some older workers choose to return to a residential location once their children have become independent.

The Department of Regional Development 2013 *Living in the Regions* survey examines why individuals choose to live in the regions and also gives consideration as to why they look to move away. The survey suggests 41% of people were considering moving – 26% away from their current region and 17% to leave the regions entirely. Of respondents from the Pilbara and the Kimberley, 58% and 41% respectively indicated they were seriously considering leaving these regions. The most common destinations people considered moving to in WA were Perth and the South West. The reasons people stated as to why they were moving include access to better shopping, health services, family support, professional development opportunities and social activities. [17]

FIFO work arrangements allow for families who do relocate to be able to enjoy these benefits, while remaining employed in the resources sector.

Many smaller mining towns are not "established"

It is important in this context to distinguish between large regional centres that have a critical mass for services in the private and public sectors (e.g. Geraldton, Kalgoorlie, Karratha, Port Hedland, Broome) and smaller mining-dominated towns that have fluctuating populations and limited services (e.g. Leonora, Paraburdoo, Newman). The focus in this section is how well these smaller towns function and the challenges they face.

Many smaller towns dominated by mining activities in regional WA are not easily categorised as 'established communities' as compared to major regional centres in the south west of the State. Towns in the Pilbara and the inland Mid West with a high dependency on the resources sector have mono-dimensional economies (and sometimes one company) contributing up to 70 per cent of their primary economic activity. They are susceptible to variations in both price and demand for the commodities; leading to fluctuations over time in populations and commercial activity.

People who may choose to work for large private and public employers (e.g. mining companies and government employers) in an area for five years or less will not likely commit to a house purchase, and will instead expect their employer to provide housing. Over the last decade, this made it difficult for people not employed by the company or government to obtain affordable accommodation (Haslam McKenzie 2008).

A related feature of these towns is a high population turnover with ABS statistics showing that less than 30 per cent of people at a census date having lived in the community five years previous [18]. This indicates many residents live in the town for employment opportunities rather than the amenities offered by the town. Many transient populations in regional WA operate on a cycle of life approach to residency – living in towns as young families, to bigger towns with older families; and then opting for FIFO to accommodate children's education needs and partner's careers etc.

The conclusion is that people resident in the town are largely attracted by the work opportunities, and not by the town itself, with a time horizon set on the period of residency. Further, managing expectations around what can be provided in a small community is difficult – with expectations from people raised in major urban settings being unlikely to be met in many small settlements.

In short, the economic environment in these towns, the nature of employment available, and the infrastructure and services on offer make it difficult for many communities to develop as 'established communities'. CME supports the Western Australian Government's Royalties for

[17] Department of Regional Development 2013, *Living in the Regions,* retrieved from http://www.drd.wa.gov.au/regions/survey/Pages/default.aspx

[18] The same percentage in the Perth metropolitan area is about 49 per cent.

Regions Program which is addressing infrastructure service deficits in some of these type of towns which will improve their attractiveness to longer-term residency.

In the construction phase of a project there is a requirement for a large workforce for a short period of time, typically two to three years. It is worth noting that while the construction phase may last a few years, many employees or contractors are only on site for a much shorter period of time. Once a project shifts to the operations phase the size of the workforce reduces considerably. This is a real challenge in small regional towns, where there is no alternative to FIFO for the construction phase. It is simply not realistic for a community to gear itself for a construction 'boom' and then to find itself in a slump when the construction phase is over and operations commence.

FIFO as a driver for regional investment

Many of the resource projects recently developed or in production in regional WA would not be economic to develop without FIFO arrangements.

FIFO enables the development of resource projects that would be uneconomic in the event a residential workforce was the only option. The provision of associated services and infrastructure for FIFO operations generates economic benefits to the region that would otherwise be lost. For example, FIFO has enabled investment in the regional aviation industry in WA and has enhanced their ability to provide services to regional and remote communities and other industries – principally tourism. Increased services have been made possible through economies of scale attributable to FIFO operations.

CME's economic contribution data shows that in 2015/16, regardless of the region, a direct financial economic contribution was made by the 46 companies who provided data. This is summarised in Table 7.

	Direct employees (who live in region)	Wages & salaries (million)	Business purchases + community contributions + local govt. payments (million)	Businesses Directly Supported	Total Direct Contribution (million)
Perth	21,155	3,400	17,200	7,210	20,600
South West	7,996	1,200	559	862	1,700
Great Southern	447	61	13	36	74
Midlands	499	75	23	81	98
South Eastern	2,712	327	996	886	1,300
Central	863	125	127	436	252
Pilbara	13,140	2,700	743	395	3,400
Kimberley	291	43	80	142	123

Table 7 – Resources Sector Contribution to Western Australia[19]

The flow effect felt throughout the state of this expenditure is seen as individual's purchase housing and goods and services in the communities in which they live. The resulting consequence of this is other jobs, whether it being a retail, hospitality or other industry sectors and further investment in the regions.

For Indigenous people in isolated communities remote from mainstream employment, FIFO employment may be one of the few opportunities to be involved in the industrial wage economy without having to leave their particular social and cultural environments. Earned incomes mean taxes for government, and where incomes are spent locally there will be spin-off employment and income benefits for other community members and local businesses[20].

[19] www.cmewa.com/economic-contribution

[20] See Storey, K. (2010). Fly in / fly out: Implications for community sustainability. Sustainability 2, 1161-1181.

An independent report by ACIL Allen Consulting estimates Rio Tinto's $425 million of regional spending generated an additional $185 million and created almost 1,250 jobs in regional Western Australia[21].

The report found 30 per cent of Rio Tinto's FIFO workforce was based in regional Western Australia in 2016, which injected $305 million in wages into those local communities.

The programme has also increased employment opportunities for Aboriginal people. Regional FIFO is currently enabling 265 Aboriginal people to remain on country and work in jobs they would not have been able to access.

Using the Kimberley region as a case in point, CME's economic contribution data demonstrates the average wage of direct employees living in the Kimberley was $147,766 per annum[22]. In comparison, figures from the ABS National Regional Profile, 2010 - 2014[23] demonstrates median wages range from $38,412 to $52,875 across the Kimberley local government areas.

The indirect benefits to the Kimberley region of those working in the resources sector receiving higher incomes are seen through flow on effects as those receiving the initial payment then seek to spend that income.

Indirect benefits of FIFO occur from:

- **those doing FIFO spending their wages and salaries in the regional communities in which they live;**
- **payments by companies of airport fees and charges and purchases from local suppliers;**
- **support by companies for community programmes and events in communities in which their employees live.**

Conclusion

CME welcomes the inquiry into transitioning regional economies by the Productivity Commission and looks forward to ongoing engagement throughout the inquiry process.

If you have any further queries regarding the above matters, please contact Nicole Roocke, Deputy Chief Executive

Authorised by	**Position**	**Date**	**Signed**
Nicole Roocke	Deputy Chief Executive	27/02/2017	
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[21] Rio Tinto media release, New report highlights economic benefits of Rio Tinto regional FIFO programme 22 February 2017

[22] http://www.cmewa.com/images/files/maps/statistical/Kimberley.pdf

[23] http://stat.abs.gov.au/itt/r.jsp?databyregion#/