PERTH
as a global minerals and energy resources hub

a FACTBase Special Report
ABOUT FACTBase

The FACTBase project is a collaborative research project between the Committee for Perth and The University of Western Australia to benchmark the liveability of Perth and its global connectedness through an examination of Perth’s economic, social, demographic and political character.

The FACTBase team of academics and researchers condense a plethora of existing information and databases on the major themes, map what is happening in Perth in pictures as well as words, and examine how Perth compares with, and connects to, other cities around the world.

Research findings are released regularly, providing an important resource for academics, planners and decision-makers on the following major themes:
• Reinterpreting the dynamics of Perth’s regional economy
• Economic governance for a globalising Perth
• Exploring ‘urban liveability’ in Perth
• Perth’s local government and governance landscape.

Committee for Perth and The University of Western Australia
November 2012
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It is with pleasure that I welcome this report which has far-reaching implications in terms of how Western Australia in general and Perth in particular could capitalise on the strength and resilience of the resource and energy sector. The preparation of this report highlights UWA’s long and productive relationship with the mining and resource industry. It is proof of our continuing commitment to foster activities that will benefit the industry and the broader community in the future.

We enjoy unprecedented opportunities in Western Australia to build on the success of the energy and resource sector, and to create a sustainable innovation economy. To achieve this, UWA will continue to partner with the resource and energy industry in undertaking cutting-edge research, in producing world-class graduates, and in fostering innovation and knowledge for a global resources hub.

Since the Committee for Perth’s formation year of 2006, many conversations have taken place about Perth as it is now and what it could or should be in the future. As a think-tank focused on realising a bright future for Perth – one that is economically prosperous, culturally diverse and globally competitive – we have spent the past five years creating a considerable knowledge base. We have researched the Perth metropolitan region and its component parts and benchmarked these against other Australian capital cities as well as resource cities globally.

One question that has continued to arise as we have developed ideas and solutions to Perth’s economic and population growth is whether Perth is a unique resource and energy hub. I am pleased that this report confirms that we are!

In this report you will find an in-depth analysis of the resource and energy sectors in Western Australia and the unique role that Perth plays as the hub to activity not only across the state, but also nationally and internationally.

My congratulations to the researchers who have prepared such a comprehensive and insightful report that will allow us and others to leverage off this great strength of ours.
The economic growth and prosperity that is currently being experienced in Perth and Western Australia rides on the back of mineral resources and energy sectors. Yet, Perth is moving away from a traditional reliance on extraction, and is becoming an increasingly unique hub in the global network of resource activities. The city is now a key player not just in production, but also in terms of corporate leadership, knowledge generation, finance and services.

This report highlights the unique nature of Perth as a global mineral resources and energy hub, and demonstrates that the city’s abundance of natural resources has opened up a diverse range of new opportunities that now see it firmly integrated within the world economy. The focus of this report on minerals and energy resources does not diminish the significant contribution of other sectors, such as agriculture, tourism and manufacturing. Rather, it offers insights into the many ways in which the city has been able to capitalise on the global linkages that mineral and energy resources have provided.

Matthew Tonts
Head of School, Earth and Environment
The University of Western Australia
ABOUT THE AUTHORS

All the authors of this report work on the FACTBase project, a collaborative research project between The University of Western Australia’s School of Earth and Environment and the Committee for Perth, aimed at benchmarking the liveability of Perth and its global connectedness through an examination of Perth’s economic, social, demographic and political character.

Matthew Tonts
(Economic Development, Labour Markets, Public Policy) is Professor of Geography and currently Head of the School of Earth and Environment. His research is focused on urban and regional development, with much of his recent work concerned with the shifting geography of corporate power, spatial labour markets and economic development, and regional policy.

Veronica Huddleston
(Socio-economic Analysis, Regional Development and Planning) is an Associate Professor of regional development and planning. With an extensive international development assistance experience in Asia and Australia, her research and project interests include macroeconomic and strategic policy and planning, restructuring and adjustment of resource-dependent communities, and social dimensions of development projects.

Paul Maginn
(Urban Planning) is an Associate Professor and Coordinator of UWA’s Urban and Regional Planning programs. His research is focused on planning policy, local government and governance and the social and cultural dynamics of cosmopolitan cities.

Paul Huddleston
(Rural and Regional Economic Development, Institutional Strengthening) is an Associate Professor with extensive research experience in both developed and developing countries in development planning, monitoring and evaluation.

Steffen Wetzstein
(Political Economy, Urban Liveability) is an Assistant Professor with specialisation on the effects of globalisation on economy and governance structures in cities and regions.
PERTH AS A GLOBAL MINERALS AND ENERGY RESOURCES HUB
EXECUTIVE SUMMARY

• The minerals and energy resources industry is, and will continue to be, a major driver of Perth’s growth and competitiveness.

• Perth is unlike many other mining and energy cities in the world, with a highly diverse resource base, a large number of locally-grown businesses, and a vibrant knowledge economy.

• In terms of liveability, Perth ranks as one of the highest of all major minerals and energy cities.

• Specialisation in, and diversification within, the industry will be further consolidated with ongoing and increasing investment in new resource projects.

• Perth’s corporate landscape is changing, pointing to Perth’s growing integration with the world city network.

• Access to skilled workers, temporarily addressed through sponsored working arrangements (such as the Subclass 457 visa), is important for the industry.

• Collaboration between the universities and academic institutions and the mining and resources industry is continuing to address skilled labour shortage as well as foster knowledge generation within the industry.

• Various research centres and centres of excellence established in support of the industry play a leading role in developing and enhancing its knowledge base and global profile.

• There is growing complementarity between the minerals and energy sectors and associated firms/companies engaged in producing and promoting technical, economic, logistical and intellectual products and services.

• Innovation will remain a key ingredient in the long-term global competitiveness of the industry.
INTRODUCTION

Cities are not merely concentrations of people but centres of economic activity. As such, economically, cities matter, as places of business, commerce and trade. They are centres of opportunity attracting people, business and investment from around the world. They are a nation’s gateway to the world and the global economy.

Major Cities Unit, Infrastructure Australia (2010:49)

The past two decades of growth and diversification in the mineral and energy resources sector has resulted in a bigger, stronger and more significant economy in Western Australia in general and in Perth in particular. Fuelled not only by the oil and gas industries but also by the significant expansion of the mining industry, particularly iron ore mining, the Western Australian economy more than doubled in size between 1990-91 and 2010-11. Western Australia’s Gross State Product in chain volume measures increased from $76.9 billion in 1990-91 to $187.1 billion in 2010-11, a rise of more than 140 per cent (ABS, 2011a).

As the State’s capital, Perth is intimately tied into this mineral and energy resources economy. It shapes patterns of urban growth, labour markets, intellectual capital, politics and the social life of the city. But to what extent is Perth unique, particularly when compared to other cities with economies closely linked to mineral and energy resources? This report begins to address this question by examining how Perth compares with other resource cities around the globe. It describes how Perth (and Western Australia) fits within the world resources economy, and the ways in which the growth of the minerals and energy sector has reshaped the city. While there is often much discussion about the difficulties associated with living in a boomtown, we argue that the changes being experienced in the city are complex and nuanced.

The report shows how the resources boom has contributed to an increase in our corporate power nationally and internationally, how it has led to a growing integration into the world economy and especially with Asia, and the ways in which new industries are being created, particularly around knowledge and innovation. Moreover, the data presented here show that Perth remains one of the most liveable cities in the world. Of course, the longer term challenge is how to capitalise upon this prosperity to ensure a sustainable legacy into the future.
While not immune to the global financial crisis, the Australian economy has continued to record favourable economic performance and remain competitive. Indeed, the International Monetary Fund’s latest World Economic Outlook confirms that Australia’s economic fundamentals are strong with the growth of real Gross Domestic Product projected to outperform every major advanced economy in 2012 and 2013 (Australian Trade Commission, 2012a).

In 2012, Australia ranked 15th out of 59 countries analysed by the Institute for Management Development on world competitiveness, measured in terms of how countries resist adversity and show resilience (IMD, 2012; 2009). Australia also placed third in the Legatum Institute’s 2011 Prosperity Index, achieving top 10 rankings among 110 countries in the areas of education (1st), personal freedom (4th), social capital (4th), governance (6th), economy (7th), and entrepreneurship and opportunity (7th) (ATC, 2012b).

In terms of stock market capitalisation, Australia’s floating capital as of August 2011 amounted to US$1,074 billion (Standard and Poor’s, Global Broad Market Index, cited in ATC, 2012c), ranking 6th out of 45 world economies.
In 2010-11, Australia’s annual export value of goods and services (based on 1 and 2 digit Standard International Trade Classification, FOB Value) rose by 22.4 per cent to A$245.7 billion (ABS, 2012a). However, in 2011-12, total exports grew by only 7.6 per cent, reaching A$264.3 billion (ABS, 2012a). Mineral fuels, lubricants and related materials continued to account for 28 per cent of the value of total exports of goods and services during this period, reaching A$75.6 billion in 2011-12 from A$69.2 billion in 2010-11.

The value of Australia’s merchandise exports increased by an annual average of 10.4 per cent between 2005-06 and 2011-12, primarily due to strong demand for Australian coal and iron ore from Asia in general and China in particular. As noted by the IMF (2011), the extraordinarily strong demand for these minerals and fuels from China’s steel mills accounted for Australia’s high terms of trade in recent years. China continues to be Australia’s largest two-way trading partner; it is the largest export market and source of imports (ATC, 2012a).
Foreign direct investment (FDI) into Australia amounted to A$507.4 billion in 2011, compared to A$218.3 billion in 2001 (ABS, 2012b). Investments in the mining industry division accounted for an increasing share of total FDI, from 16.8 per cent in 2001 to 31.9 per cent in 2010 (ABS, 2011b). From 2001 to 2010, mining FDI posted an annual average growth of 17.3 per cent, compared to 9.6 per cent annual average growth for total FDI.

LEVEL OF FOREIGN INVESTMENT IN AUSTRALIA BY INDUSTRY DIVISION, 2001-2010

ANNUAL GROWTH RATES OF FOREIGN INVESTMENT IN AUSTRALIA BY INDUSTRY DIVISION, 2001-2010
Leading investors between 2001 and 2011 continue to be the United States, United Kingdom, Japan and the Netherlands (ABS, 2012b). Australian direct investment abroad totalled $338.9 billion in 2011, a decline from 2010’s investment total of $374.9 billion, but still higher than the $219.0 billion that had been invested in 2001.

### LEVEL OF FOREIGN INVESTMENT IN AUSTRALIA ($ MILLION) BY COUNTRY, 2001, 2006 AND 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>68,840</td>
<td>86,599</td>
<td>122,379</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>48,082</td>
<td>55,822</td>
<td>69,747</td>
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<tr>
<td>Japan</td>
<td>16,303</td>
<td>23,819</td>
<td>52,334</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10,540</td>
<td>24,633</td>
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<tr>
<td>Switzerland</td>
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<td>16,646</td>
<td>23,005</td>
</tr>
<tr>
<td>Singapore</td>
<td>14,873</td>
<td>5,590</td>
<td>19,966</td>
</tr>
<tr>
<td>Canada</td>
<td>2,181</td>
<td>7,661</td>
<td>17,326</td>
</tr>
<tr>
<td>Germany</td>
<td>6,069</td>
<td>10,558</td>
<td>14,333</td>
</tr>
<tr>
<td>China (excludes SARs and Taiwan)</td>
<td>n.p.</td>
<td>550</td>
<td>13,354</td>
</tr>
<tr>
<td>Bermuda</td>
<td>1,123</td>
<td>1,229</td>
<td>7,791</td>
</tr>
<tr>
<td>France</td>
<td>n.p.</td>
<td>11,743</td>
<td>6,777</td>
</tr>
<tr>
<td>Hong Kong (SAR of China)</td>
<td>1,709</td>
<td>4,758</td>
<td>6,714</td>
</tr>
<tr>
<td>New Zealand</td>
<td>5,444</td>
<td>9,566</td>
<td>5,980</td>
</tr>
<tr>
<td>Belgium</td>
<td>2,869</td>
<td>2,286</td>
<td>5,622</td>
</tr>
</tbody>
</table>

n.p. – not available for publication but included in totals where applicable.
PERTH AND WESTERN AUSTRALIA’s CONTRIBUTION TO THE AUSTRALIAN ECONOMY

Our unique strength is the combination of geographical advantages (our close proximity to Asia) and our vast, abundant, world-class natural resources. Our resources are not only abundant, they are diverse. So, add abundant natural resources to a perfect strategic location, and we are blessed. It is an extraordinary combination of strengths.


Resource exploitation and development since the first major gold rush in the 1890s has been a steady characteristic of Western Australia. Today, the productivity and diversity of the State’s mineral resources is evidenced by the fact that as of 2010-11, over 50 different mineral resources were mined as part of 545 commercial mineral projects operating in 966 mine sites (Department of Mines and Petroleum, 2011). In the same period, there were also 73 operating oil and gas fields in the State (DMP, 2011).

Western Australia maintained its status as the nation’s leading exporter in 2011-12, contributing a record 45.6 per cent towards

Australia’s merchandise export earnings worth $264.3 billion.

Queensland followed with 20 per cent, New South Wales with 15.4 per cent and Victoria contributed 8.2 per cent.

Mineral and petroleum resources dominate the State’s exports, contributing a substantial 92 per cent towards the State’s total merchandise exports in 2011 (DMP, 2012).
WA’S DIVERSE MINERALS AND ENERGY RESOURCES

One of the globally unique characteristics of Western Australia’s resource economy is its diversity. Western Australia’s resources sector is responsible for the production/extraction of over 50 mineral resources (DMP, 2012). This compares favourably with Brazil, which in 2010 marketed about 80 mineral commodities (USGS, 2012a). Furthermore, WA’s resource sector is considerably more diverse than Alberta, Canada which mainly produces crude oil, condensates, coal and natural gas and the American states of Texas and Colorado which primarily produce oil as well as industrial and other non-fuel mineral commodities (Canadian Centre for Energy, 2012 and USGS, 2012a).

In 2011, Australia was the world’s second largest iron ore producer after China, but ahead of Brazil, India and Russia (USGS, 2012b). Western Australia provided 474 million tonnes of iron ore output, accounting for 22.2 per cent of the world’s iron ore output that year (DMP, 2012). WA also accounted for 14.1 per cent of the world’s production of alumina and together with the rest of the other states made Australia the fifth largest aluminium producer in 2011 after China, Russia, Canada and the United States (USGS, 2012b). In terms of nickel production, WA’s nickel companies produced 13.4 per cent of the world’s nickel output, making Australia the fifth largest producer after Russia, Indonesia, the Philippines and Canada (USGS, 2012b). WA’s production of several other commodities also included the following shares of total world production (by quantity) – garnet (11%), zircon (7%), LNG – seaborne trade (7%), gold (6%), ilmenite (6%), rutile (6%), diamonds – mainly industrial grade (5%), and salt (4%) (DMP, 2012).

SELECTED WA COMMODITIES RELATIVE TO WORLD PRODUCTION ENDING 2010, BY QUANTITY

RESOURCE BASE OF SELECTED CITIES AND COUNTRIES

**Calgary, Alberta, CANADA**
Conventional crude oil, condensate, pentanes plus, oil sands, natural gas, coal

**Denver, Colorado, USA**
Fuel (oil) and non-fuel minerals (molybdenum concentrates, gold, construction sand and gravel, portland cement, and crushed stone)

**Houston, Texas, USA**
Oil and non-fuel minerals (portland cement, crushed stone, construction sand and gravel, salt, industrial sand and gravel)

**Aberdeen, SCOTLAND**
Oil and gas

**Stavanger, NORWAY**
Coal, iron ore, natural gas, nickel, petroleum and titanium

**Rio De Janeiro, BRAZIL**
Over 80 commodities – iron ore, bauxite-alumina-aluminum, manganese, gold, tin, nickel, zinc, potash, uranium, niobium, copper, gemstones, coal, oil, natural gas

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### Top 10 producers by country, selected resources, 2011

<table>
<thead>
<tr>
<th></th>
<th>Iron Ore</th>
<th>Aluminum</th>
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<tbody>
<tr>
<td>China</td>
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<td>China</td>
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<td>Australia</td>
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<tr>
<td>Brazil</td>
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<tr>
<td>India</td>
<td>United States of America</td>
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<tr>
<td>Russia</td>
<td>Australia</td>
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<tr>
<td>Ukraine</td>
<td>United Arab Emirates</td>
<td>United Arab Emirates</td>
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<tr>
<td>South Africa</td>
<td>India</td>
<td>Brazil</td>
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<td>United States of America</td>
<td>Bahrain</td>
<td>Norway/South Africa</td>
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<td>Canada</td>
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<td>Iran</td>
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**Gold**

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<th>Indonesia/Philippines</th>
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<td>United States of America</td>
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<td>Russia</td>
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<td>South Africa</td>
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<td>Peru</td>
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<tr>
<td>Canada</td>
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<td>Ghana/Indonesia</td>
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<td>Mexico</td>
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<tr>
<td>Papua New Guinea</td>
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**Nickel**

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<td>Russia</td>
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<td>New Caledonia</td>
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<td>China</td>
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<td>Cuba</td>
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<td>Colombia</td>
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<td>South Africa</td>
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**Perth, Western Australia, Australia**

Over 50 mineral and energy resources – alumina, base metals (copper, lead, zinc), coal, construction materials (gravel, rock, sand), diamonds, gems and semi-precious stones, gold, heavy mineral sands, iron ore, nickel, petroleum, salt, silver, tin-tantalum-lithium, natural gas and oil.

**Brisbane, Queensland, Australia**

Coal, petroleum (coal seam gas, condensates, crude oil, LPG, processed natural gas), minerals and metals.
The past decade witnessed considerable growth of the Western Australian resources industry, with the value of mineral and petroleum sales reaching $107 billion in 2011, compared to $27.8 billion in 2001. According to the Department of Mines and Petroleum (2011), this had been achieved as a result of robust overseas demand for Western Australia’s resources as well as high commodity prices that continue to support a substantial pipeline of investment activity in the sector. The industry posted an average annual growth rate of 16.2 per cent between 2001 and 2011.

In terms of the composition of the State’s minerals and petroleum resources, the share of iron ore to the total value increased significantly during the past decade in view of the sharp increase in the unit price of iron ore.

From 19 per cent in 2001, iron ore accounted for 59 per cent of the total value of minerals and petroleum resources production in 2011.

Crude oil and condensate, on the other hand, registered a shift, from 22 per cent in 2001 to 11 per cent in 2011.
WESTERN AUSTRALIA’S MINERALS AND PETROLEUM EXPORTS
BY COMMODITY, 2001 AND 2011

2001

- Iron Ore: 19%
- Crude Oil and Condensate: 22%
- Alumina: 14%
- Nickel: 7%
- Gold: 12%
- LNG: 12%
- Others: 14%

2011

- Iron Ore: 59%
- Crude Oil and Condensate: 11%
- Alumina: 4%
- Nickel: 4%
- Gold: 12%
- LNG: 9%
- Others: 5%
LIVEABILITY RANKING OF KEY RESOURCE CITIES

Calgary, Alberta, CANADA
Area 704.51 km²
Population (2011) 1.095 million

Houston, Texas, USA
Area 1,522.93 km²
Population (2011) 2.145 million

Rio De Janeiro, BRAZIL
Area 1,260 km²
Perth is rather unusual amongst resource cities in that it ranks comparatively high on various liveability indices. On the EIU rankings of liveable cities, Perth is consistently in the top 10 in the world. In 2012, of the world’s largest resource cities, only Calgary surpassed it. Liveability is particularly important in an era where people with high-end skills tend to be extremely mobile, often making decisions about where to live based on lifestyle. While Perth performs well, it is not without challenges and lags behind some other Australian cities.
Large companies and the power they wield are at the heart of modern economies and societies.

Tonts and Taylor (2009:1) note that corporate headquarters play a pivotal role in the socio-economic and cultural development of cities by adding prestige, generating investment and specialist employment opportunities in areas such accounting, legal services and information technology.

Analysis of the market capitalisation trends in the Australian stock market evidence of a shifting geography of corporate power that points to the increased competitiveness and growth potential of Perth as an emerging corporate centre for the resources sector. As of September 2011, total market capitalisation on the Australian Stock Exchange reached $1,374.8 billion, 12 per cent of which is accounted for by Perth companies. Sydney and Melbourne accounted for 43 per cent and 34 per cent of total market capitalisation, respectively.

However, of the total companies listed Australia-wide, Perth ranked highest as the preferred location, with 34 per cent or 830 companies headquartered in Perth as of September 2011. Sydney and Melbourne, on the other hand, accounted for 23 per cent and 14 per cent, respectively.

Materials and energy companies made up 43 per cent of the companies headquartered in Perth, buoyed undoubtedly by the city’s strategic location in providing access to major oil, gas and mineral resources. While many of the firms basing themselves in Perth’s corporate landscape are small in terms of market capitalisation, their presence “provides evidence of the increasing competitiveness of the Western Australian economy and of the increasing attraction of Perth to corporate investors” (Huddleston and Huddleston, 2010:10).
ASX Market Capitalisation and Number of Listed Companies (As of September 2011)

Legend

- Market Capitalisation (x$1000)
  - 34,134,706
  - 60,027,701
  - 167,358,971
  - 459,939,323 - 596,411,365

- Number of Companies
  - 553-831
  - 326-552
  - 176-325
  - 83-175

Size of the circles are proportional to the number of listed companies (numbers are inside circles). The intensity of the colour indicates the level of market capitalisation.

NOTE: The map only shows headquarters for companies where the location could be accurately attributed.

Data Sources: AFR Smart Investor - Securities (as of Sept 2011)
Drafted by: J.N. Rao (2012) for UWA

Perth
Sydney
Adelaide
Brisbane
Melbourne

Perth
Sydney
Adelaide
Brisbane
Melbourne

1:40,000,000 @ A4

0 250 500 1,000 1,500
Kilometers

ASX Market Capitalisation and Number of Listed Companies
(As of September 2011)
Six of the top 100 corporations as of September 2011 have headquarters located in Perth. Five of these companies are in the materials/energy sector, although it is worth noting that Wesfarmers is also involved in three coal companies. Extending the analysis to the top 300 companies shows the increasing status of Perth as a preferred location of corporate power, with the number of companies headquartered in the city increasing by 31 per cent, from 42 companies in 2005 to 55 companies in 2011.

The corporate landscape of the minerals and energy sector within Perth is made up of more than just ‘dig-it-up, ship-it-out’ companies. The sector is supported by a growing knowledge-based cluster of supportive industries that include mining software development, exploration, engineering and processing (Tonts and Taylor, 2009). Alongside these companies are the divisional/regional headquarters of some of the world’s largest minerals and energy operations such as Rio Tinto, BHP Billiton, Chevron Australia and Shell Australia.

Ongoing investment in new resource projects in Western Australia will further consolidate Perth’s increasing stature as a global resources hub. As noted by Huddleston and Huddleston (2010:10), “Perth’s increasing engagement with the world economy as more than a hub for the provision of raw materials, but as a locale of decision-making and power, places it in a unique position in the Australian economy.”
ASX Top 200 Companies Located in Perth, WA

Legend
Companies by Sector
- Energy
- Materials
- Others

Data Sources:
- WA Background sourced from Landgate 2012
- Road data sourced from Landgate 2012
- ASX Companies sourced from AFR Smart Investor - Securities (as of September 2011)
- Drafted by: J. N. Rao (2012) for UWA

(Companies 30 & 31 are not listed in the Australian Stock Exchange)
PERTH AND THE WORLD’S CITY NETWORK

The global economy is often conceived as a complex network of firms. These networks are organised around cities, with New York, Tokyo and London typically seen as the major nodes or ‘command centres’ for global capital. Other leading centres include Chicago, Frankfurt, Hong Kong, Shanghai and Zurich. The role of these cities in the world city network is in large part a result of the size and influence of their financial, legal and consulting firms. These service firms play a critical role in articulating the flows of finance, knowledge and influence within the global economy.

The presence of these firms within cities has become an increasingly important reflection of how well a city is ‘hooked in’ to the global economy (Taylor, 2004). While Perth has long had the presence of a few large international business service firms, it is also clear that a growing number are choosing to locate in the city as its economic role changes. This not only enhances the city’s strategic economic position, but helps to inject talent and diversity into the local community.

<table>
<thead>
<tr>
<th>Country</th>
<th>Financial</th>
<th>Legal</th>
<th>Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>UK</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Germany</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of new global business firms established in Perth since 2011, by sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>7</td>
</tr>
<tr>
<td>Legal</td>
<td>9</td>
</tr>
<tr>
<td>Consulting</td>
<td>6</td>
</tr>
</tbody>
</table>
The Department of State Development has collected information on the establishment of new firms in these sectors, and has found that more than 20 have opened offices in Perth in the past 2-3 years. These include firms from Europe, Asia and North America, and point to Perth’s growing integration with the world city network. In a number of cases, Perth is the only city in Australia in which these firms have chosen to locate.

The growing importance of firms in sectors such as legal, finance and consulting services is evident in the data on the gross value added (GVA) for each industry within cities (as calculated in a study undertaken by SGS Economics and Planning, 2011). Between 1990 and 2011, sectors such as professional and technical services and financial services have grown considerably in their contribution to GVA within the city. Indeed, these sectors are now contributing a greater share than more ‘traditional’ sectors such as manufacturing, retailing and utilities.

**GROSS VALUE ADDED FOR SELECTED INDUSTRIES, 1990 AND 2011**

![Gross Value Added Chart](chart.png)
PERTH’S ENTERPRISE STRUCTURE

Perth will need to be a creative hub to become a more internationally competitive city, to attract and retain skilled workers and to provide synergy with [its] natural resource-based economy.

WAPC (2011:vii)

The mining industry is critical to the performance of the Perth economy. As emphasised by Tonts (2010), this sector is nearly twice as important to Perth’s economy when compared to any other sector. In all of Perth’s suburbs except North Perth (3.3 per cent), the mining sector accounted for over five per cent of total employment in 2006, compared to 1.2 per cent Australia-wide (ABS, 2007). But growth was not limited just to this sector. Employment in professional, scientific and technical services areas that directly support the resources sector were also relatively higher as a proportion of total employment compared to the whole of Australia (between 13.7 per cent and 18.8 per cent compared to 6.6 per cent). As Wray (2009) points out for the nickel industry, there is a lot of potential in the sector to accommodate allied, knowledge-based industries such as software development and exploration companies.

EMPLOYMENT IN SELECTED INDUSTRIES – PERTH SUBURBS AND AUSTRALIA, 2006

<table>
<thead>
<tr>
<th></th>
<th>Mining</th>
<th>Professional, Scientific and Technical Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perth Eastern Suburb</td>
<td>5.6%</td>
<td>15.7%</td>
</tr>
<tr>
<td>Perth Northern Suburb</td>
<td>3.3%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Central Perth</td>
<td>5.2%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Perth Southern Suburb</td>
<td>5.3%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Perth Western Suburb</td>
<td>5.8%</td>
<td>18.8%</td>
</tr>
<tr>
<td>AUSTRALIA</td>
<td>1.2%</td>
<td>6.6%</td>
</tr>
</tbody>
</table>
PERTH – TOWARDS A GLOBAL MINING HUB

In FACTBase Bulletin 4 (November 2009), Felicity Wray argues that the notion that primary industries and a globalising knowledge-based economy do not fit together remains a myth that must be challenged. Using Western Australia’s nickel industry, Wray argues for the emergence of a resources complex that recasts Perth as a crucial centre of authority on resource exploration and discovery in the global economy.

Western Australia generates its wealth primarily from growing agricultural products or digging holes in the ground and extracting minerals and petroleum products. Thus, at first glance, there would appear to be little to suggest that this Australian state fits the notion of an advanced knowledge economy. The international literature, while analysing successful transitions to knowledge-rich activities in North-America and Europe, is remarkably silent on those places whose economies rely on the exploration and exploitation of natural resources. Wray’s research, however, highlights the existence of four important hallmarks of innovative, knowledge-based economies that presently exist in Western Australia:

• Agglomeration economies as a result of the clustering of a considerable number of nickel exploration firms in West Perth;
• Technological change brought about by the booming mining-related software development sector in Perth;
• Global pipelines and local buzz that provide an indication of the myriad of valuable global economic connections and interactions; and
• The central role of universities in the development and expansion of the Western Australian nickel industry.

Wray (2009) concludes that these facets coalesce to position Perth and Western Australia as a key node and global command centre in the global mining community.
PERTH’S EMPLOYMENT STRUCTURE

Perth is no different from many cities around the world in struggling to maintain its talent pool and to grow expertise by attracting the very best from around the globe.

Chandran Nair, Global Institute for Tomorrow, CfP Newsletter Edition 2 (October 2007)

Recently released quarterly labour force data from the Australian Bureau of Statistics (2012d) indicate that as of August 2012, a total of 1.285 million people were employed in Western Australia, a 40.1 per cent increase from the aggregate employment levels of August 2000. Sectors that performed remarkably well over this twelve year period include the mining sector which accounted for an increased share of total employment from 3.5 per cent in 2000 to 9.0 per cent in 2012, or a total of 115,777 persons.

Allied industries, such as construction; transport, postal and warehousing; and professional, scientific and technical services also recorded increases in their overall share of total employment during this time period.

NUMBER OF PERSONS EMPLOYED IN SELECTED INDUSTRIES
WESTERN AUSTRALIA, AUGUST 2000 TO AUGUST 2012

- Mining
- Transport, postal and warehousing
- Construction
- Professional, scientific and technical services
Employment data collected by the Department of Mines and Petroleum from operating mines and companies carrying out exploration on mineral and mining leases under the Mining Act 1978 indicate the same trend. For 2010-11, 92,564 persons were directly employed in the industry, an increase of 16.8 per cent compared to 2009-10 employment levels (DMP, 2011). The bulk of this employment (65 per cent) was accounted for by iron ore, gold and bauxite-alumina operations as demand for these resources from Asia continued to post strong growth.

While mineral development in the past was traditionally accompanied by a growth in permanent settlement, commuter mining (more commonly known as ‘fly-in/fly-out’) has become the preferred system in Western Australia for new mines developed at a distance from established population centres (Storey, 2001:135). Several domestic and regional airlines operate from the Perth Domestic Airport, which generated total domestic passenger traffic for 2010/11 of 8.2 million people (Perth Airport, 2011). According to a report featured in The Australian (November 15, 2011:2), about 2.2 million passenger movements were directly related to the resources sector, an increase from 1.5 million in 2007/08.
Major Destinations of Fly-in Fly-out Workers

Legend

- **Airports (consist of public and/or town landing facilities)**
- **Airstrips (generally company-owned landing facilities)**

Data Sources:
- WA Coastline sourced from Landgate 2012
- Drafted by: J. N. Rao (2012)
To enhance further growth in the mining sector and allied industries, access to skilled workers is important. Australia, like other developed countries with ageing populations and declining fertility rates, faces a global trend characterised by intensified competition for permanent and temporary skilled and unskilled immigrants. The Temporary Business (Long Stay) – Standard Business Sponsorship (Subclass 457) is the most commonly used program for Australian or overseas employers to sponsor skilled overseas people to work in Australia temporarily.

When compared to other States, Western Australia had the third highest proportion of 457 visa holders in the period 2006-07 to 30 June 2012, sitting behind New South Wales and Victoria. Western Australia accounted for almost 20 per cent of Australia’s total intake of 457 visa recipients during this period. This proportion is expected to steadily increase in view of continued employment and wage opportunities in the State. Indeed, in the period 2011-12 to June 2012, Western Australia accounted for 24 per cent of total 457 visa holders, surpassing Victoria (20 per cent). As a proportion of the total estimated resident population for both periods, 457 visa holders comprised 0.4 per cent of the total Western Australian population.

DESTINATION OF LONG STAY TEMPORARY BUSINESS ENTRANTS (VISA CATEGORY 457), 2006-07 AND 2011-12

<table>
<thead>
<tr>
<th>State</th>
<th>2006-07</th>
<th>2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>35%</td>
<td>33%</td>
</tr>
<tr>
<td>Vic</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>WA</td>
<td>18%</td>
<td>24%</td>
</tr>
<tr>
<td>SA</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>NT</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>TAS</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Qld</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Not Specified</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
The top ten citizenship countries where most temporary (457 visa) migrants to Western Australia originate from include the United Kingdom, Philippines, and Ireland, among others. Almost half of the nominated positions located in WA for the period 2006-07 to 30 June 2012 were filled up by skilled workers from these three countries, with the United Kingdom accounting for 25.8 per cent, followed by the Philippines (13.8 per cent) and Ireland (7.0 per cent).

The mining sector was the major beneficiary of WA’s intake of temporary migrants; jobs in the sector comprised 24.9 per cent of the total jobs filled by these migrants for the same period. The construction sector accounted for the second major group of migrants (21.2 per cent) while manufacturing made up 10 per cent of the total intake. Other sectors that availed of workers in this visa category include health care and social assistance (9.4 per cent) and the accommodation and food services sector (4.3 per cent).

In November 2011, the Australian Immigration Minister announced that the Federal government would fast-track 457 visa applications and double the sponsorship period to six years for accredited sponsors. This announcement is expected to further bolster employment in the mining sector and allied industries.
TOP CITIZENSHIP COUNTRIES FOR VISA CATEGORY 457 – NOMINATED POSITIONS LOCATED IN WESTERN AUSTRALIA, 2006-07 TO 2011-12

SECTORAL BREAKDOWN FOR VISA CATEGORY 457 – NOMINATED POSITIONS LOCATED IN WESTERN AUSTRALIA, 2006-07 TO 2011-12
While WA’s economy is heavily influenced by mining, much of the activity in WA is smart. WA is a world leader in mining technology … and mining in WA is now more research and development-intensive … This indicates that WA is making the step from a natural resources economy to a knowledge economy, a key step in turning natural resources into broader economic development.

Centre for International Economics (2009:17)

There is compelling evidence to suggest that the resource-based Western Australian economy is transitioning to a highly globally connected knowledge economy – and the city-region of Perth is the central hub in the network. One example of this global success story is the clustering of exploration firms in industries such as nickel, copper and gold in the suburb of West Perth.

It is clear that the profitability and quality of mineral extractions is increasingly dictated by the skill and expertise of supporting industries, such as information technology.

Indeed, a staggering 60 per cent of global mining software is now produced in Perth (Director, Department of WA State Development, 2010).

The increasing emergence of WA and Perth as a knowledge hub within the global resources sector is reflected in the relative number of graduates within selected knowledge economy disciplines, such as physics and astronomy, earth sciences, engineering and related technologies, process and resources engineering, civil engineering and law.

While Western Australia’s national population share accounted for only around ten per cent, data from 2009 show that WA’s five universities produce 14.6 per cent of the nation’s domestic graduates in these disciplines, and an even higher proportion of 18.9 of international graduates.

In 2012, The University of Western Australia joined the ranks of the world’s top 100 universities (Shanghai Jiao Tong University’s Academic Rankings of World Universities). Perth can thus be regarded as a talent-producing hothouse nationwide, and even more so, on an international stage.
The transformation of Western Australia’s Capital City into a vibrant centre of knowledge production and exchange can also be illustrated by changes in the use of land in the city of Perth. Between 1990 and 2007, for example, there was significant growth of commercial establishments for the creative industries; defined as activities that focus on creating and exploiting intellectual property products. During this 17-year period, the number of new creative industry establishments set up in the City of Perth increased from 517 in 1990 to 715 establishments in 2007 (WAPC/Department of Planning/City of Perth, 2009). The majority of this growth can be linked to engineering services and computing services.

The recently published report *The Evolving City: An Atlas of Change in the City of Perth 1990-2007* clearly illustrates that there are two distinct mining industry clusters within Perth–West Perth and in the Central Business District (WAPC/Department of Planning/City of Perth, 2009). The majority of industry establishments within these clusters are mostly those belonging to three categories – other mining, energy and iron ore industries. This agglomeration, or clustering, of economic activity is evidence of the changing configuration within the commercial heart of the city-region of Perth towards becoming a centre of innovation, knowledge creation and knowledge exchange.

The transformation of Perth into a knowledge-rich economy is also demonstrated by its increased global connectivity. Perth is “increasingly recognised as a global solutions centre” in oil and gas (Director, Department of WA State Development, 2010). This development is mirrored in the choice of Perth as one of the 11 global locations of KPMG’s Oil and Gas Centres of Excellence aimed at supporting companies in an intensely competitive oil and gas industry (KPMG, 2005).

**NUMBER OF GRADUATES IN RESOURCES-RELATED KNOWLEDGE ECONOMY SUBJECTS, 2009**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University of Western Australia</td>
<td>4,842</td>
</tr>
<tr>
<td>Curtin University</td>
<td>3,464</td>
</tr>
<tr>
<td>Other WA Universities</td>
<td>2,800</td>
</tr>
</tbody>
</table>

Source: DIISRTE’s uCube on 2009 Enrolments at Australian Institutions, Executive Information System, UWA Planning Services.
GLOBAL RESEARCH LEADERSHIP

Western Australia is blessed with an unusually wide variety of resource commodities that secure significant market shares globally. It is no surprise then that in the State’s premier university, The University of Western Australia, a number of successful research centres have been established and are playing a leading role in developing and enhancing the knowledge base and global profile of Western Australia’s resources sector. Institutions such as the Energy and Minerals Institute, the Cooperative Research Centre for Mining, the International Mining for Development Centre, the Western Australian Energy Research Alliance, the Centre for Exploration Targeting, the Centre of Excellence for 3D Mineral Mapping, the Centre for Energy, the Centre for Mining, Energy and Natural Resources Law, the Centre for Offshore Foundation Systems, and the Centre for Petroleum Geoscience and CO₂ Sequestration fulfil a wide range of vital roles from basic research policy development, technology transfer, mineral mapping, education and legal affairs.

The fastest growing hub of excellence amongst these organisations is the Centre for Exploration Targeting (CET), a joint venture between The University of Western Australia, Curtin University, and the Minerals Industry that is focused on advancing the science of exploration targeting. The CET is a world-recognised research centre with 75 Corporate Members, 42 staff, 30 research PhD/ MSc students, a turnover of over $5 million per year and research outcomes that are impacting on exploration industry practice and the academic research community with papers published in the world’s leading science journal, Nature and Science. The CET undertakes projects in Western Australia and around the world, contributing to the increased rate of discovery of new mineral deposits.
## The University of Western Australia’s Research Institutes and Centres

<table>
<thead>
<tr>
<th>Research Centre</th>
<th>Programs and Research Focus</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy and Minerals Institute</td>
<td>Energy; Exploration and mining; Environment; Policy and business; Community engagement; Minerals; World-class research facilities and infrastructure</td>
<td><a href="http://www.emi.uwa.edu.au/">http://www.emi.uwa.edu.au/</a></td>
</tr>
<tr>
<td>Cooperative Research Centre for Mining</td>
<td>Automation; Equipment and power management; Drilling processes for fugitive emissions; Rock fragmentation and handling</td>
<td><a href="http://www.crcmining.com.au/">http://www.crcmining.com.au/</a></td>
</tr>
<tr>
<td>International Centre for Mining and Development</td>
<td>Capacity building in developing countries to boost governance and management of extractive industries, improve legislative frameworks, and improve knowledge of country resources base</td>
<td><a href="http://im4dc.org/">http://im4dc.org/</a></td>
</tr>
<tr>
<td>Centre for Exploration Targeting</td>
<td>Industry linkage; Research on gold, iron and magmatic mineral systems, progressive risk and value analysis, and geophysics and image analysis; Education and training</td>
<td><a href="http://www.cet.edu.au/">http://www.cet.edu.au/</a></td>
</tr>
<tr>
<td>Centre of Excellence for 3D Mineral Mapping</td>
<td>Development of capabilities that will deliver through the government geosurveys, web-accessible, seamless, accurate 3D mineralogy that integrates surface (airborne and satellite) and subsurface (drill core) hyperspectral sensing data and carries it into quantitative mineral systems analysis</td>
<td><a href="http://c3dmm.csiro.au/">http://c3dmm.csiro.au/</a></td>
</tr>
<tr>
<td>Research Centre</td>
<td>Programs and Research Focus</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Centre for Offshore Foundation Systems</td>
<td>Provides solutions to worldwide offshore foundation needs of the petroleum industry through high quality modelling and experimental facilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cofs.uwa.edu.au/">http://www.cofs.uwa.edu.au/</a></td>
<td></td>
</tr>
<tr>
<td>Centre for Petroleum Geoscience and CO2 Sequestration</td>
<td>Research on 3D Earth modelling, 3D Geophysical imaging and 4D Geophysical monitoring, with applications to conventional and unconventional hydrocarbons and CO2 sequestration, and with links to geothermal and groundwater</td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://cpg.uwa.edu.au/">http://cpg.uwa.edu.au/</a></td>
<td></td>
</tr>
</tbody>
</table>

**CENTRE FOR EXPLORATION TARGETING**

**– IN THE DIRECTOR’S WORDS ...**

CET Director Professor Campbell McCuaig points out that CET has been very successful in identifying and engaging with ‘thought leaders’ from around the world in both industry and academia to tackle exploration geoscience. Current collaborations span 70 Corporate Members and multiple universities and government agencies on 6 continents. The majority of projects are all Perth-based, attracting investment in research and development, and top minds to Western Australia. This process helps to build the world’s best knowledge economy in exploration geoscience. Impact on the industry is evident by the amount of industry engagement with CET, the fact that two exploration companies have been floated off of CET research, and several CET software tools have been commercialised and co-funded by industry.
KNOWLEDGE PROMOTION AND EXCHANGE

We have a city full of great people – with energy, entrepreneurial skill, and creativity. Perth should be striving to secure a reputation as a global centre of excellence in [the resources and] oil and gas sector and a major business centre geographically close to the key cities in Asia.


The complex production and supply chains associated with mineral and resources extraction mean that there is a wide range of firms that provide facilities, equipment and services that ultimately make up the entire resources industry. These facilities, equipment and services include: asset management, exploration, engineering (e.g. civil, mechanical, electrical, chemical and environmental), extraction and processing, construction, geology, geophysics, occupational health and safety, transport, research and development, project management, legal services, urban planning, and even anthropology.

The various firms involved in the aforementioned activities are all engaged in the production and promotion of various forms of knowledge, products and services of a technical, economic, logistical and intellectual nature. All this knowledge production and promotion comes together and is showcased to a global audience at a myriad of industry conferences, exhibitions and seminars. As well as contributing to knowledge and product promotion, mining and resources industry conferences help generate visitor dollars for hotels, restaurants and shops.

Importantly, the growth and diversity of Perth’s resources sector places it at the hub of the global network of knowledge exchange, with an increasing number of high profile events held in the city each year.
Available data for the period 2007-2012 show that there were at least 109 mining and resources-related conferences held within Perth/WA. This generated an estimated 66,500 attendees and approximately 226 days of presentations and exhibitions.

Assuming average conference attendance fees of between $800 and $1,000 per delegate, this means that mining and resources conferences have generated between $53 million and $66 million for the local economy since 2007 in fees alone.

Assuming further that resources conference delegates spend, on average, $1,000 on hotel accommodation, food, shopping, entertainment and other goods and services, then this adds a further $66 million to the local economy.

The number of conferences and attendees has been on a generally upward trend since 2007, with the decline in 2009 largely attributed to the impacts of the ‘global financial crisis’. Conference attendee numbers for 2012 are well on track to surpass 2011 figures, considering that the five events held to date in 2012 is 82 per cent of the 2011 attendee numbers which were based on 21 events.

### Mining and Resources-Related Conferences in Perth, 2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Events</th>
<th>% Total Events</th>
<th>Total Days</th>
<th>% Total Days</th>
<th>Total Delegates</th>
<th>% Total Delegates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012*</td>
<td>5</td>
<td>4.5</td>
<td>14</td>
<td>6.1</td>
<td>13156</td>
<td>19.6</td>
</tr>
<tr>
<td>2011</td>
<td>21</td>
<td>19.1</td>
<td>49</td>
<td>21.5</td>
<td>16078</td>
<td>24.0</td>
</tr>
<tr>
<td>2010</td>
<td>17</td>
<td>15.5</td>
<td>41</td>
<td>18.0</td>
<td>13074</td>
<td>19.6</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
<td>10.0</td>
<td>27</td>
<td>11.8</td>
<td>7347</td>
<td>11.0</td>
</tr>
<tr>
<td>2008</td>
<td>35</td>
<td>31.8</td>
<td>64</td>
<td>28.1</td>
<td>10715</td>
<td>16.1</td>
</tr>
<tr>
<td>2007</td>
<td>21</td>
<td>19.1</td>
<td>33</td>
<td>14.5</td>
<td>6500</td>
<td>9.7</td>
</tr>
</tbody>
</table>

| 2007-12 | 110 | 100 | 228 | 100 | 66870 | 100 |

*Data relates to 5 events held up until July 2012

---

2 Data provided by Perth Convention Bureau and Promaco Conventions – please note that data is incomplete as not all conferences and exhibitions held in Perth/WA are centrally recorded.
NOTABLE CONFERENCES IN PERTH, 2008-2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ASX Australian Resources Conference</td>
<td>1,500-4,500*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AGT Conference and Exhibition</td>
<td>300</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AOG Exhibition and Conference</td>
<td>12,000</td>
<td>9,000</td>
<td>5,000</td>
<td>5,000</td>
<td>-</td>
</tr>
<tr>
<td>APPEA Conference and Exhibition</td>
<td>-</td>
<td>2,200</td>
<td>-</td>
<td>-</td>
<td>2,500</td>
</tr>
<tr>
<td>Energising South East Asia</td>
<td>-</td>
<td>991</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Construction &amp; Mining Equipment Expo</td>
<td>-</td>
<td>-</td>
<td>4,500</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Deep Offshore Technology Conference</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,500</td>
</tr>
</tbody>
</table>

AGT = Australian Gas Technology  
AOG = Australian Oil and Gas  
APPEA = Australian Petroleum Production and Exploration Association  
* Takes place from 12-14 November 2012, attendee estimate from the Perth Convention Bureau

Accounting for almost 75 per cent of conference attendees between 2007 and 2012, the Perth Convention and Exhibition Centre (PCEC) is the “preferred” location of mining and resources conferences. The PCEC also hosted the Commonwealth Heads of Government Meeting (CHOGM) in October 2011. This major event attracted a total of 11,000 delegates across the main conference, the Business Forum, the Youth Forum and the Peoples Forum.

Data obtained on the number of attendees at conferences/exhibitions/seminars ranged from as low as 41 to an estimated 12,000 at the 2012 Australasian Oil and Gas (AOG) Exhibition and Conference. The AOG conference series has been the largest mining and resources conference event over the last 4 years with attendee numbers increasing from an estimated 5,000 in 2009.

Other notable large conferences held in Perth include those that are national and international in scope and often involve direct participation and presentations from senior executives of multinational corporations and senior Ministers within State and Federal government. As such, State and Federal government departments and, more importantly, private firms allied to the mining and resources industry contribute to the promotion of knowledge, products and services at conferences by taking out exhibition spaces. The AOG 2012 Conference, for example, had more than 450 exhibitors while the APPEA 2011 Conference had over 160 exhibitors.
Looking to the future, the AOG Conference returns to Perth next year, scheduled on February 20-22, 2013. In addition, Austmine’s National Conference will be held from 20-23 May and is expected to attract 300 industry delegates. In April 2016 Perth will host LNG 18, a triennial conference, organised by the International Gas Union (IGU), Gas Technology Institute (GTI) and International Institute of Refrigeration (IIR). This event is expected to attract 5,000 delegates from across Australia and internationally.

Overall, conferences/exhibitions act as synergistic spaces for the promotion and transfer of knowledge, products and services within the mining and resources industry. Formal presentations, networking opportunities and exhibitors provide a platform for all those involved in the resources sector to learn about new techniques, policies, philosophies and products, nurture new business relationships and collaborations and purchase of goods and services designed to enhance the overall efficiency and effectiveness of the resources sector.

Resources sector conferences and exhibitions not only play a role in generating knowledge; they also play a significant role in injecting visitor dollars into Perth’s local economy. Furthermore, these conferences and the resources industry in general contribute in highlighting Perth’s globalising city status. This increasingly global status is reinforced in Perth’s performance within the Economist Intelligence Unit’s Global Liveability Survey and Mercer’s Quality of Life Survey.
INNOVATION AND THE FUTURE

As a state, we are leading a transition through remarkable times and the innovative mindset of our people places us in a position of strength going forward.

Sam Walsh, ‘Reflections of Perth’, Insight (Dec 2010:10)

The 2011 INSEAD Global Innovation Index ranked Australia as 21st out of 125 countries in terms of innovation capabilities and results.

Recent developments in Western Australia indicate that the State is an attractive place to locate for innovating organisations and companies. As the Centre for International Economics (CIE, 2009:76) outlines, CSIRO has shifted more of its research and development activity into WA; BHP opened one of its three Global Technology Centres in Perth in 2006; and Chevron opened the Perth Global Technology Centre in 2007. Other mining companies that are taking the lead in innovation and technology include Rio Tinto (see inset), and Shell, with its Prelude Floating LNG Project on track to becoming the world’s first floating LNG facility.

It is important to take note of the need for innovation to remain competitive. The current chair of Telstra Catherine Livingstone, has stressed that: “In this environment [of tremendous structural change], your ability to adapt is determined by your ability to innovate, and you need innovation in every sense of the word: technical, managerial, and in terms of process.” (ICAA, 2012) For the minerals and energy sector, the challenge according to Batterham (2011, in The Weekend Australian, November 12-13:14), is to continue investing resources, time, money and people in innovation in order to remain competitive in the long-run.
Rio Tinto’s recently-built Remote Operations Centre (ROC) located near Perth’s Domestic Airport features an operational control room with sophisticated communications systems, office block and supporting infrastructure, and allows for potential future expansion. ROC employees in collaboration with their Pilbara-based colleagues will oversee, operate and optimise the use of key assets and processes in its Pilbara mines, 1,500 kilometres north of Perth. The use of off-highway trucks, such as the Komatsu Autonomous Haulage System (pictured above) operating without human drivers, is currently being tested for later introduction and deployment into Rio Tinto’s Iron Ore operations in the Pilbara.

Chief executive, Tom Albanese, emphasised in a media release that, “The aim is to make Rio Tinto a global leader in fully integrated, automated operations.” The ROC and the driverless trucks program is part of Rio Tinto’s ‘Mine of the Future’ Program. This program encompassing automated mine-to-port iron ore operations is part of the company’s drive to maintain its position as Australia’s leading iron ore producer.
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