

Opportunities in Mineral Processing and Mining Services

Overview

Since early in the establishment of the Swan River colony minerals have been a major driver of the Western Australian economy. This State has one of the most diverse range of minerals in the world, with about 50 different minerals presently in commercial production.

These are exciting times for investors as the minerals sector changes from focusing on raw commodities to downstream processing and value adding.

The excellent prospects for the State's mineral and downstream processing sector is reflected in more than \$A20 billion worth of current resources projects, either committed or under active consideration. Western Australia accounts for more than half of Australia's investment in proposed mining or downstream processing ventures.

Western Australia's mineral and petroleum production is significant in world terms and is valued in 2000-01 at \$A27.59 billion. The major market for the State's mineral products is Asia.

Western Australia's Share of World Production

Minerals	%
Gold	8
Iron Ore*	14
Alumina	18
LNG	8
Diamonds	34
Ilmenite	25
Rutile	24
Zircon	31
Nickel	14

* 34 percent of traded iron ore

Source: Department of Mineral and Petroleum Resources

Iron and Steel Products

Iron ore is the second most valuable resource commodity in Western Australia, with more than \$A3.4 billion worth of product being produced in 2000.

However, significant scope exists to substantially upgrade this value through the potential development of iron and steel plants in different parts of the State.

A 2.3Mt/a capacity hot briquetted iron plant has been established at Boodarie, near Port Hedland, while Rio Tinto has declared Kwinana as the preferred site for a 700,000t/a pig iron plant, based on its Hismelt process.

Other iron or steel making plants are also on the drawing board for the **Pilbara** and **Mid West** regions. Collectively, these plants would cost several billion dollars to build, with the potential to add considerable value to exports, and to generate substantial opportunities for employment, local suppliers and governments in terms of higher flow-on revenues.

The scale, expected long life and diverse ownership of iron ore projects in the **Pilbara**, offers opportunities for a range of support services. The State Government's Industry Relocation Scheme offers assistance to encourage enterprises providing services to mining and minerals processing to relocate to the regions and closer to their clients.

A study of the feasibility of ferro-alloys has identified profitable opportunities for ferro-manganese and silico-manganese alloy plants in the



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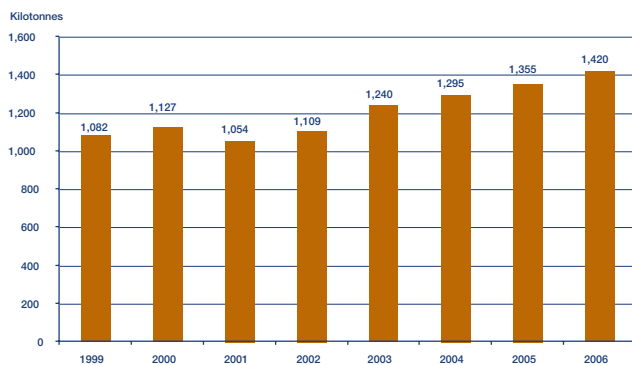
North West of the State, ferro-silicon in the **Wheatbelt or South West** regions and a ferro-vanadium plant in the **South West** region. Vanadium is currently produced at Windimurra in the State's **Mid West** region.

Nickel Smelting and Refining

The nickel industry in Western Australia has come a long way since the State's first nickel mine began production in 1967.

Western Australia's production of nickel in concentrate, matte or metal form was 167,000 tonnes in 2000-2001, up 16% on the previous year. This represents about 14% of world mined nickel production and makes this State the world's third largest producer.

Fig.1 World Consumption of Nickel



Source: ABARE

With the current production capacity, and planning for new projects well advanced, regional Western Australia is set to be the number one producer of mined nickel in the world in the next 5-10 years.

The nickel industry is currently focussed on the **Goldfields-Esperance** region where mining, concentrating, smelting and refining take place. Refining to produce nickel metal also takes place at Kwinana in the Perth Metropolitan region. Nickel concentrate is exported from Esperance to Europe and Canada. New mines have begun operating recently, others are being planned in the Shires of Ravensthorpe and Leonora in the **Goldfields-Esperance** region. Further potential for nickel is being actively pursued, with exploration taking

place not only in the **Goldfields-Esperance** region, but also in the Murchison area of the **Mid West** region and, most significantly, the West Musgrave Ranges near the WA/South Australian/Northern Territory borders.

Alumina

Western Australia supplies about 18% of the world's smelter-grade alumina and the State's alumina refineries are amongst the most cost efficient in the world.

With the possibility of further falls in real energy prices in WA, along with rising power prices in the USA, the prospects for the establishment of an aluminium smelter is significantly enhanced. This smelter could be either located in the South West of the State, close to the source of alumina, or in the Mid West for ready access to gas.

There are also opportunities for fused alumina, which is used in heat and wear resistance applications such as refractory linings, abrasives and as feed for advanced ceramics. There is a growing demand for fused alumina products in Japan, South-East Asia and Australia.

Petro-chemicals

There is potential in the Pilbara region for the establishment of a world-scale integrated petrochemical complex taking advantage of the region's abundance of key raw material inputs such as natural gas and salt. Current projects under active consideration include plants for synthetic hydrocarbons, ammonia, urea, methanol and dimethyl ether.

Titanium Products

Western Australia is one of the world's biggest producers of feedstock for titanium dioxide pigments and is a major supplier of zircon for ceramics and foundry applications.

The State's \$A850 million mineral sands industry is situated in the **Mid West, South West** and **Wheatbelt** regions. The State's mineral sands



industry is shifting into higher value added products such as synthetic rutile and titanium dioxide pigment. Titanium dioxide pigment is used in paint, paper, plastics and ceramics manufacture.

Services to Mining

Western Australian companies are world leaders in a number of mining services such as applied geoscience, contract mining, environmental management and rehabilitation, minerals exploration, mining software and metallurgy. Australia exports over \$A1 billion of mining related equipment and services each year of which between 20 to 25 per cent is estimated to be sourced from Western Australia. The export market for mining services in Asia is expected to remain strong despite the recent downturn in some South East Asian economies.

With the continued strong growth and a very positive outlook for the domestic minerals and minerals processing industries, more mining service providers are seeing greater benefits in relocating to the regional areas to improve access to their client base.

The **Goldfields and Pilbara** are two areas where there is a high concentration of mineral and

processing operations. Other locations such as Mount Magnet in the **Mid West** region provide immediate access to the goldmines of the **Mid West** region while still affording good access to the more eastern **Goldfields** region and the **Pilbara** iron ore industry to the north.

The **Goldfield-Esperance** region is a central location for companies servicing the gold and nickel industries and has complementary and well developed mining equipment supply and maintenance industries.

Burgeoning world-class oil and gas, salt, gold and tantalite resources as well as the State's substantial iron ore provinces provide many opportunities for exploration and mining services. Industrial and community infrastructure in the **Pilbara** continues to develop. The expansion of the workforce required to service the Pilbara's mining, petroleum and mineral processing industries presents substantial opportunities for housing construction.

The benefits for mining service companies to locate in regional Western Australia are augmented by regional investment schemes such as the Relocation Feasibility Scheme and the Industry Relocation Scheme.


For further information contact:

Department of Minerals and
 Petroleum Resources
 PO Box 7606
 Cloisters Square
 PERTH WA 6000
 Telephone: +618 9327 5555
 Fax: +618 9327 5500
 Email: enquiries@drd.wa.gov.au
 Internet: <http://www.mpr.wa.gov.au>

**FOR MORE INFORMATION ON
 INDIVIDUAL REGIONAL
 INVESTMENT OPPORTUNITIES
 CONTACT:**
GASCOYNE DEVELOPMENT COMMISSION

Stuart House, 15 Stuart Street (PO Box 781)
 CARNARVON WA 6701
 Phone +618 9941 1803
 Fax: +618 9941 2576
 Email: info@gdc.wa.gov.au
 Internet: <http://www.gdc.wa.gov.au>

**GOLDFIELDS-ESPERANCE
 DEVELOPMENT COMMISSION**

Ground Floor, Viskovich House
 377 Hannan Street (PO Box 751)
 KALGOORLIE WA 6430
 Phone +618 9091 1166
 Fax +618 9021 7941
 Email: gedckal@gcdc.wa.gov.au
 Internet: <http://www.gcdc.wa.gov.au>

GREAT SOUTHERN DEVELOPMENT COMMISSION

110 Serpentine Road
 ALBANY WA 6330
 Phone +618 9842 4888
 Fax +618 9842 4828
 Email: gcdc@gcdc.wa.gov.au
 Internet: <http://www.gcdc.wa.gov.au>

KIMBERLEY DEVELOPMENT COMMISSION

Papuana Street (PO Box 620)
 KUNUNURRA WA 6743
 Phone +618 9168 1044
 Fax +618 9168 1473
 Email: kdc@kdc.wa.gov.au
 Internet: <http://www.kimberley.wa.gov.au>

MIDWEST DEVELOPMENT COMMISSION

SGIO Building
 45 Cathedral Avenue (PO Box 238)
 GERALDTON WA 6531
 Phone +618 9921 0702
 Fax +618 9921 0707
 Email: info@mwdc.wa.gov.au
 Internet: <http://www.mwdc.wa.gov.au>

PEEL DEVELOPMENT COMMISSION

45 Mandurah Terrace (PO Box 543)
 MANDURAH WA 6210
 Phone +618 9535 0000
 Fax +618 9535 2119
 Email: pdc@peel.wa.gov.au
 Internet: <http://www.peel.wa.gov.au>

PILBARA DEVELOPMENT COMMISSION

Shop 2, 6 Wedge Street (PO Box 544)
 PORT HEDLAND WA 6721
 Phone +618 9173 8400
 Fax +618 9173 1881
 Email: pdc@pdc.wa.gov.au
 Internet: <http://www.pdc.wa.gov.au>

SOUTH WEST DEVELOPMENT COMMISSION

9th Flr, Bunbury Tower
 61 Victoria Street (PO Box 2000)
 BUNBURY WA 6230
 Phone +618 9792 2000
 Fax +618 9791 3223
 Email: swdc@gateway.net.au
 Internet: <http://www.swdc.wa.gov.au>

WHEATBELT DEVELOPMENT COMMISSION

14 Wellington Street (PO Box 250)
 NORTHAM WA 6401
 Phone +618 9622 7222
 Fax +618 9622 7406
 Email: wdc@wdc.wa.gov.au
 Internet: <http://www.wheatbelt.wa.gov.au>



For general queries: Department of Local Government and Regional Development
 Telephone: +618 9327 5666, Fax: +618 9327 5921, Email: info@dlgrd.wa.gov.au

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