

Chapter 8 Mining and Energy

Key Points

- » In terms of output, mining is the largest industry in the Territory, accounting for 26 per cent of GSP in 2006-07, compared to 7 per cent nationally.
- » Mining output is volatile as production is dominated by a small number of large projects. Global supply and demand conditions and the impact of exchange rate movements on competitiveness are key factors affecting production levels and price.
- » The value of Territory mining output has grown substantially in recent years, driven by increased gas and condensate production from Bayu-Undan, as well as increases in mineral commodities such as manganese and lead-zinc.
- » Further increases are expected in the next few years, driven by increased production and strong growth in prices of several key commodities.
- » Mineral and energy production is estimated to increase by 7.7 per cent to \$5.6 billion in 2007-08. Higher growth of 34.3 per cent is forecast for 2008-09.
- » In the medium term, high levels of exploration expenditure are expected to continue, supported by ongoing strong commodity prices and Territory Government initiatives.

Mining

In terms of output, mining is the most significant industry in the Territory, accounting for 26 per cent of gross state product (GSP) in 2006-07, compared to 7 per cent nationally (Table 8.1). However, its high contribution to GSP is not reflected in its share of Territory employment. According to the 2006 Census, resident employment in the mining industry was 1700 or 2.0 per cent of total resident employment. An additional 5000 employees are associated with the Territory mining and energy industry as fly-in fly-out (FIFO) workers, manufacturing workers at Alcan's Gove alumina plant and the Wickham Point liquefied natural gas (LNG) plant, and construction workers on mining and energy projects.

Table 8.1: Mining as a Percentage of GSP, 2006-07

	%
New South Wales	2.4
Victoria	2.0
Queensland	7.7
South Australia	4.1
Western Australia	27.7
Tasmania	4.5
Northern Territory	25.7
Australian Capital Territory	0.0
Australia¹	7.1

¹ Mining as a percentage of GDP
Source: ABS Cat. No. 5220.0

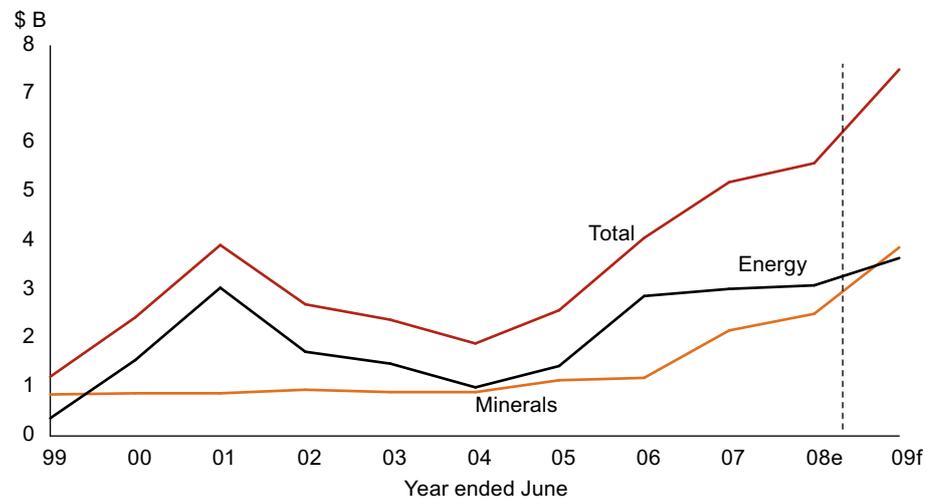
Mining is a source of Territory Government revenue through royalties for most onshore mining operations. Royalty revenues have grown significantly, increasing by 126 per cent in the three years to 2007-08 to an estimated annual amount of \$88.4 million. The Commonwealth also pays a grant to the Territory Government in

lieu of uranium royalties, estimated at \$4.0 million in 2007-08. In addition, royalties based on the production of offshore gas and oil comes under the Commonwealth's tax jurisdiction.

A number of mining commodities are utilised as feedstock for significant value-adding operations in the Territory, most notably alumina production at the Alcan refinery, which uses bauxite feedstock, and LNG manufacturing at Wickham Point, using gas feedstock from Bayu-Undan. The value of production of these commodities is classified as manufacturing by the Australian Bureau of Statistics (ABS), and is therefore not included in the total output of the mining industry. For more details on these products, see Chapter 9, Manufacturing.

In 2007-08, the value of mining and energy production is estimated to increase by 7.7 per cent to \$5.6 billion. The increase is largely being driven by growth in the value of production of liquid petroleum gas and condensate from the Joint Petroleum Development Area, as well as increased output of a number of mineral commodities, including manganese, magnetite, gold and bauxite (Chart 8.1).

Chart 8.1: Value of Mining and Energy Production and Processing (nominal dollars)



e: estimate; f: forecast

Source: Northern Territory Treasury; Department of Business, Economic and Regional Development; Department of Primary Industry, Fisheries and Mines

Minerals

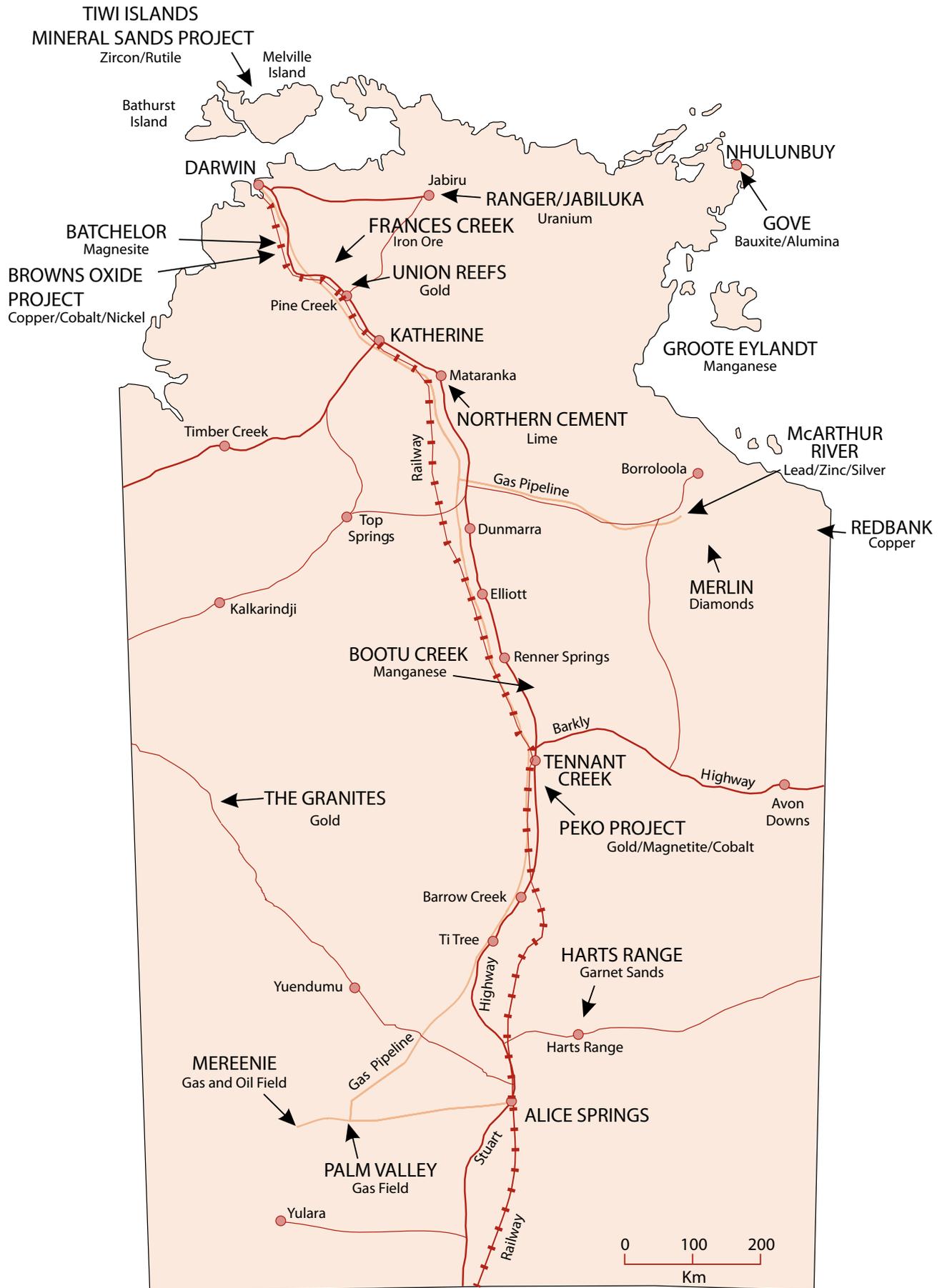
Manganese production at Groote Eylandt, lead-zinc production at McArthur River and gold production from The Granites mine in the Tanami region account for an estimated 68 per cent of the total value of mineral production in 2007-08. These three mines are expected to continue to dominate production in the medium term.

Bauxite production at Gove also contributes significantly to total mineral production, and is used as feedstock for alumina manufacturing at the Alcan refinery (see Chapter 9, Manufacturing).

The McArthur River mine is in the process of being converted from an underground to an open cut operation. Processing of zinc-lead concentrate has continued during the conversion phase using ore mined from the test pit and the initial stages of the open pit.

Manganese production from the Bootu Creek mine commenced in June 2006. This has led to manganese contributing a growing share of the total value of mineral production in recent years. Global demand for manganese, which is used in the production of steel, has been driven by strong growth in the demand for steel from China.

Map 1: Onshore Mineral and Energy Resources



Other important mineral operations in the Territory include:

- the Union Reefs plant and surrounding gold mines located near Pine Creek;
- the Frances Creek iron ore mine, near Pine Creek;
- the Browns polymetallic deposit of lead, cobalt, copper, nickel and silver in the Batchelor area;
- the Peko Tailings project near Tennant Creek, producing magnetite, gold, copper and cobalt; and
- the Merlin diamond field southeast of Borroloola.

Uranium mining is reported under the 'Energy' section below.

2007-08 Mineral Production

The nominal value of Territory mineral production is estimated to increase by 14.9 per cent to \$2.5 billion in 2007-08 (Chart 8.2).

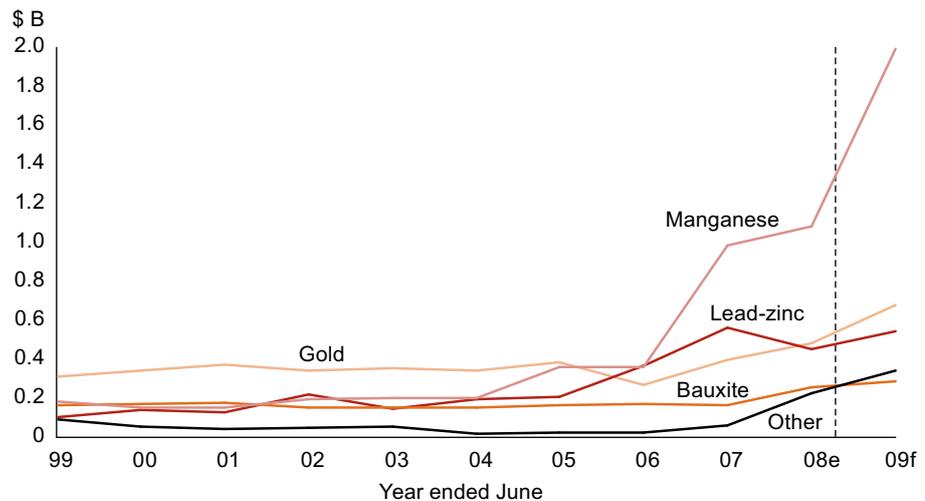
The value of gold production in 2007-08 is estimated to increase by 21.7 per cent to \$482 million. Declining production at The Granites mine in the Tanami region has been more than offset by increased production at the Union Reefs plant near Pine Creek. The plant is operated by GBS Gold, and produces gold using feedstock ore from a number of underground and open pit mines in the Pine Creek and Katherine areas.

The value of bauxite production is estimated to increase by 52.1 per cent to \$254 million in 2007-08. With the Alcan Gove refinery expansion completed, production of bauxite is expected to ramp up over 2007-08 to the new plant's higher production capacity of 3.8 million tonnes of alumina per annum.

The value of lead-zinc production at McArthur River is estimated to decrease by 19.8 per cent in 2007-08 to \$454 million, as increased production volumes are offset by declining prices. Following a decrease in production in 2005-06, due to the cessation of underground mining, production levels have been gradually increasing as work progresses on the conversion of the mine to an open cut operation.

The value of manganese production is estimated to increase by 10.5 per cent to \$1.1 billion in 2007-08, driven by increased production at both the GEMCO mine at Groote Eylandt and the Bootu Creek mine.

Chart 8.2: Value of Mineral Production and Processing (nominal dollars)



e: estimate; f: forecast

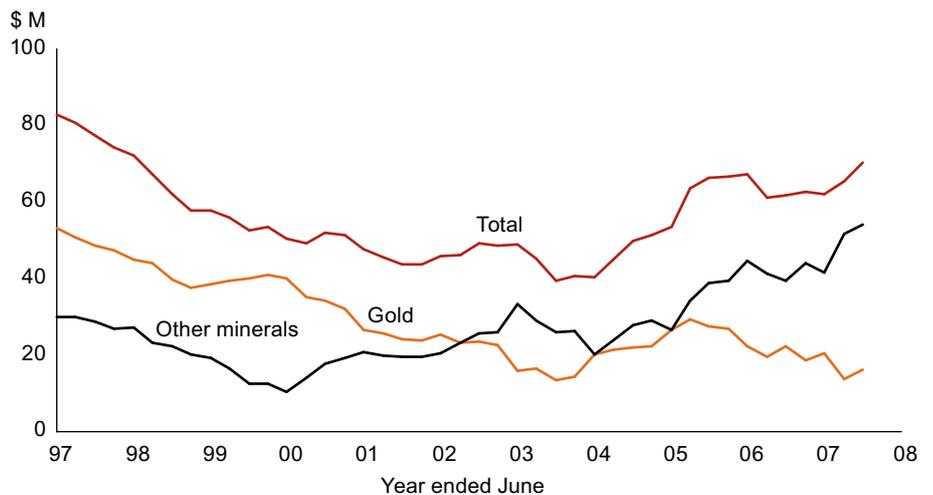
Source: Northern Territory Treasury; Department of Business, Economic and Regional Development; Department of Primary Industry, Fisheries and Mines

Exploration

Mineral exploration in the Territory decreased in 2006-07, the latest year for which data on exploration is available, but still remains at historically high levels. Exploration continues to be supported by high commodity prices and strong global demand, particularly from China. In the Territory, private mineral exploration expenditure (not including exploration for uranium) decreased by 7.6 per cent to \$62 million in 2006-07. However, the latest data indicates that exploration expenditure increased substantially in the first half of 2007-08, resulting in an increase of 13.7 per cent to \$70 million in the year to December 2007 (Chart 8.3).

Increased exploration expenditure has been influenced by the Territory Government's initiative, Bringing Forward Discovery, launched in 2007 and building on the previous initiative, Building the Territory's Resource Base. The initiative aims to expand publicly available geoscience data, and to promote opportunities for exploration and mining investment in the Territory.

Chart 8.3: Northern Territory
Mineral Exploration
(moving annual total)



Source: ABS Cat. No. 8412.0

Energy

The significant energy resources in the Territory are oil, uranium, natural gas, LPG and condensate (a light hydrocarbon liquid used to manufacture petrol and petrochemicals, and often found mixed with deposits of natural gas). The Territory's major energy resources and operations include:

- Ranger uranium mine, and undeveloped uranium resources Jabiluka and Koongarra in west Arnhem Land;
- onshore gas and oil operations in the Amadeus Basin at Palm Valley and Mereenie;
- offshore oil operations at Laminaria-Corallina, Jabiru and Challis/Cassini, and Puffin in the Timor Sea; and
- undeveloped offshore gas and condensate deposits, including Greater Sunrise, Evans Shoal, Petrel/Tern and Crux/Argus in the Timor Sea.

In addition, 50 per cent of the value of oil and gas production from the Joint Petroleum Development Area (JPDA) is also attributed to the Territory. Currently, the only producing field in the JPDA is Bayu-Undan (gas, LPG and condensate), following the end of production from Elang/Kakatua (oil) in mid 2007.

2007-08 Energy Production

The nominal value of energy production is estimated to increase by 2.4 per cent to \$3.1 billion in 2007-08, driven largely by the higher value of liquids production from the JPDA, as strong increases in oil and gas prices more than offset decreased production.

The value of oil production (excluding JPDA) is estimated to decrease by 10.0 per cent to \$689 million, driven by lower production at Laminaria-Corallina. The natural decline in production of the mature field has been exacerbated by the temporary shut down of the Corallina well in September 2007, as repair work is conducted. Full production from Corallina is anticipated to resume in September quarter 2008.

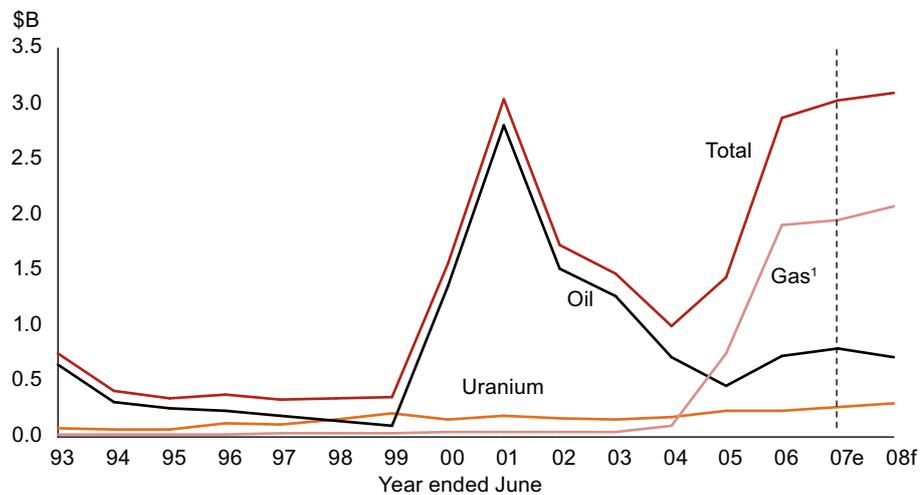
The decline in production from Laminaria-Corallina has been partially offset by the commencement of production from the Puffin field in October 2007. Located in the Ashmore and Cartier Islands Adjacent Area, the field was initially forecast to produce 30 000 barrels of oil day (higher than current output from Laminaria-Corallina), however technical difficulties have so far limited production to less than one-third of this amount.

The value of uranium ore output from the Ranger mine is estimated to increase by 10.9 per cent to \$303 million, as production recovers from the impact of heavy rains experienced in the March quarter 2007, which had prevented access to higher grade ores. An increase in the realised sales price of uranium from the Ranger mine is also expected to contribute to the growth in the value of production in 2007-08.

The value of offshore gas production from the Bayu-Undan field is estimated to decrease by 10.2 per cent to \$154 million in 2007-08. Lower output was caused by a planned maintenance shutdown of the offshore facility during September and October 2007.

LPG and condensate production from the JPDA is also forecast to decrease due to the maintenance shutdown at Bayu-Undan, although strong price growth will result in the value of production increasing by an estimated 7.6 per cent.

Chart 8.4: Value of Territory Energy Production (nominal dollars)



e: estimate; f: forecast

1 Includes gas, condensate and liquid petroleum gas

Source: Northern Territory Treasury; Department of Business, Economic and Regional Development; Department of Primary Industry, Fisheries and Mines

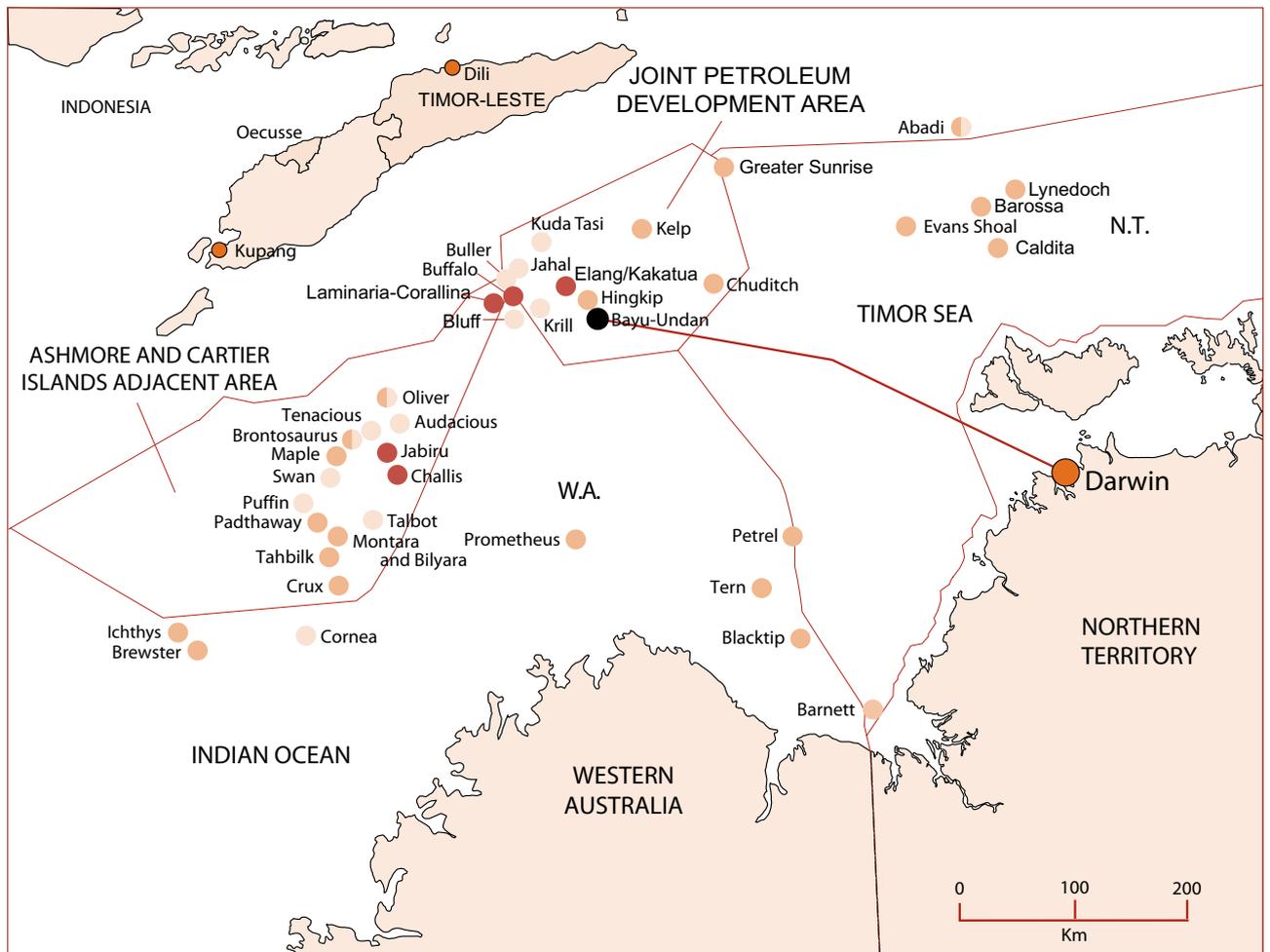
Exploration

Sustained high oil and gas prices globally have led to a resurgence in exploration activity in the Territory in recent years. Following a tripling of oil and gas exploration expenditure in 2004-05, expenditure tripled again in 2005-06, to a total of \$299 million. Oil and gas exploration expenditure has since declined, falling by 6.6 per cent to \$280 million in 2006-07, however this remains significantly higher than the long-term average.

Like mineral exploration, increased oil and gas exploration has been supported by the Territory's Bringing Forward Discovery initiative through the provision of geoscience data to explorers. The initiative has contributed to a major increase in the

Map 2: Timor Sea Oil and Gas

number of onshore exploration permits.



LEGEND

- Producing gas field
- Producing oil field
- Discovered undeveloped gas field
- Discovered undeveloped oil field
- Gas pipeline

Uranium exploration, previously concentrated in west Arnhem Land and dominated by a few companies, expanded significantly in recent years, driven by strong increases in uranium prices since 2001. By June 2006, more than 40 companies were active in almost every geological province in the Territory.

Outlook

Growth in the total value of mineral and energy production is expected to increase by 34.3 per cent in 2008-09, resulting in a total value of production of \$7.5 billion.

The outlook for minerals and energy is determined by global supply and demand, with world economic growth and the exchange rate being major influences on demand. Despite a forecast slowdown in global economic growth, driven in part by the downturn in the US economy, sustained growth in China and other developing countries is expected to support ongoing strong demand for energy and mineral commodities. Although global production has been increasing, output has struggled to keep up with commodity demand due to the long lead time in developing major mining projects, as well as rising construction and operating costs. The international competitiveness of Australian commodity producers may also be enhanced by a forecast moderate depreciation of the Australian dollar in 2008-09.

Minerals The value of mineral production in the Territory (excluding manufacturing) is forecast to increase by 54.3 per cent to \$3.9 billion in 2008-09. The increase is due largely to a forecast increase in the value of manganese production, as well as increases in gold and lead-zinc.

The rise in the value of manganese production will be driven by further growth in output from Groote Eylandt. GEMCO is in the process of expanding the capacity of the mine's processing plant, with commissioning expected to be completed by the end of 2008. The resulting increase in output, combined with significant growth in manganese prices, is forecast to lead to an 83.9 per cent increase in the value of manganese production in 2008-09, contributing 36.4 percentage points to total growth in Territory mineral production.

The value of gold production is forecast to increase by 41.2 per cent to \$681 million in 2008-09. The increase will be driven by the continued expansion of GBS Gold's Union Reefs project, incorporating ore feedstock from a number of mines in the region. The increased output is anticipated to add 8 percentage points to total growth in Territory mineral production in 2008-09.

The value of Territory base metal production, comprising mainly lead-zinc concentrate, as well as copper concentrate and zircon, is forecast to rise in 2008-09 to \$615 million. Increased production of lead-zinc from McArthur River Mine, resulting from an expansion of the mine's processing capacity, will more than offset a forecast decline in lead-zinc prices.

Production of iron ore at Frances Creek will continue to ramp up in 2008-09, increasing to a total of \$102 million, contributing 2.6 percentage points to total growth in Territory mineral production.

Energy The value of energy production is forecast to increase by 18.1 per cent to \$3.7 billion in 2008-09, driven by increased offshore oil and gas production and higher oil prices.

Oil The value of oil production will increase by 44.3 per cent in 2008-09, as full production from Corallina recommences in late 2008, supported by a full year of production from Puffin. The normal ongoing decline in output from Laminaria-Corallina will resume after 2008-09, however offshore oil volumes may be boosted in the medium term if efforts to address the production difficulties at Puffin are successful. In addition, a number of other marginal oil discoveries in the Timor Sea await further appraisal and/or development, including Audacious, Barnett, Montara, Oliver, Talbot and Tenacious.

The Australian Bureau of Agricultural and Resource Economics (ABARE) has forecast a moderate decline in oil prices in 2009, although this may be partially offset by any depreciation of the Australian dollar. In addition, limited spare global production capacity means that potential supply disruptions, such as those associated with geopolitical uncertainty, may result in significant ongoing oil price volatility.

Gas Production from Bayu-Undan is forecast to return to normal levels following the planned maintenance shutdown in September and October 2007. The value of gas production is forecast to increase by 11.4 per cent to \$172 million in 2008-09, while the value of LPG and condensate production will increase by 13.0 per cent to \$2.1 billion.

In the medium term, the Territory's significant offshore gas reserves could lead to a major development phase for gas production and gas-based manufacturing. If efforts to bring more Timor Sea gas onshore are successful, it could be used as feedstock

for new manufacturing industries (see the Manufacturing chapter for more detail). Middle Arm in Darwin Harbour has been identified as a potential site for a major gas-based industrial estate and associated port facilities.

Woodside remains committed to the development of the Greater Sunrise gas field, however the timing and nature of the development remain uncertain. In particular, Woodside has yet to decide on whether to locate the LNG processing facility in Darwin, Timor-Leste or on a floating vessel in the Timor Sea. Woodside has stated, however, that a final investment decision will be made in 2009, with the first shipment of LNG as early as 2013.

The Northern Territory's Power and Water Corporation has signed an agreement with Eni Australia for the purchase of gas from the Blacktip field, a Western Australian administered deposit 100 kilometres west of Wadeye in the Bonaparte Basin. The agreement secures the supply of gas from Blacktip to meet the Territory's long-term gas requirements. Construction of the pipeline is expected to begin in the 2008 dry season, with first delivery of gas scheduled for the March quarter 2009.

Uranium Following significant growth in uranium spot prices since 2000-01, ABARE is forecasting a moderate decline over the next few years. Despite this, average Australian contract prices are forecast to increase in 2008-09. Larger Australian producers, including Ranger, sell the majority of their production under long-term contracts, which results in sales prices being only partially influenced by the spot market. In recent years, contract prices have been significantly below the spot price, as many were negotiated when the uranium market was much weaker.

In the Territory, uranium production is forecast to return to normal levels in 2008-09, following strong production in 2007-08 as output recovered from the impact on the Ranger operating pit of heavy rains during the previous wet season. The value of production is forecast to fall by 5.8 per cent in 2007-08, with the decline in production partially offset by higher prices.

Energy Resources Australia (ERA) is planning to expand the current operating pit at its Ranger mine, which has the potential to extend the life of the pit to 2012, with most production occurring during 2011. The expansion is possible due to the continuing high price of uranium, which makes it viable to mine and process lower quality ore.

ERA's Jabiluka mine remains on a stand-by care and environmental maintenance status, and the operator has given an undertaking to the traditional owners that mining will not begin without their consent. Reserves at Jabiluka are estimated to be sufficient to maintain production for nearly three decades.

Exploration Minerals exploration expenditure in the Territory has recovered significantly in the past three years, following a period of gradual decline over the seven years to 2003-04, while petroleum exploration has risen to record levels. In the medium to long term, the level of exploration is expected to remain at high levels, consistent with Australian trends and supported by Territory Government initiatives.