Chapter 8

MINING AND ENERGY

The mining industry in the Northern Territory remains the single most significant contributor to Gross State Product (GSP), reflecting the Territory's resource endowment. In 1998-99, the industry accounted for 13.8% of GSP. Although this is three percentage points lower than 1997-98, it remains over three times the national contribution. Lower commodity prices and production contributed to the decline in mining's contribution to the Territory's GSP.

The mining sector in the Territory includes metallic minerals, non-metallic minerals and energy minerals such as crude oil, natural gas and uranium oxide.

Mining is a highly capital intense activity with low employment relative to other industry sectors. Nationally, mining contributed 4.2% to Gross Domestic Product

Table 8.1

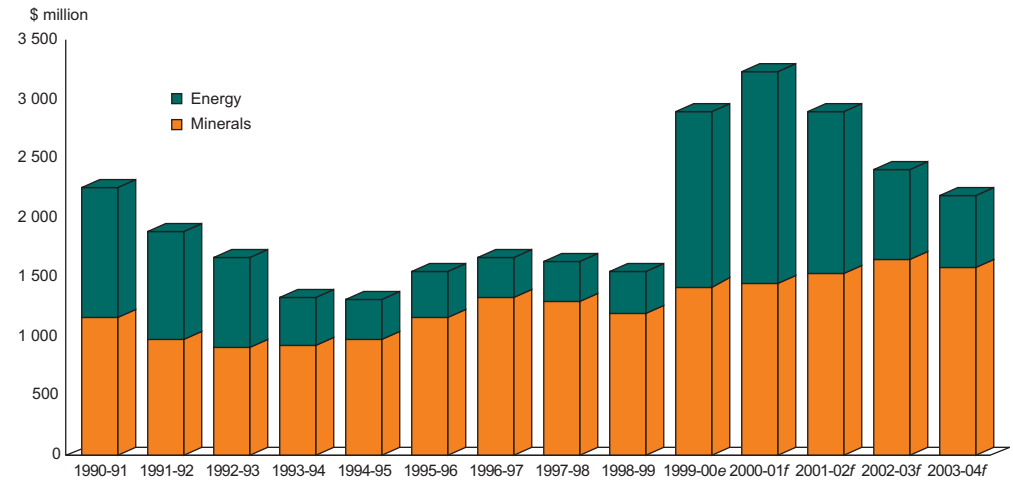
MINING

	% of GSP
Western Australia	17.4
Northern Territory	**13.8**
Queensland	5.2
South Australia	2.3
Victoria	2.1
Tasmania	2.0
New South Wales	1.7
Australian Capital Territory	0.0
Australia	**4.2**

Source: ABS Cat. No. 5220.0, 1998-99

Figure 8.1

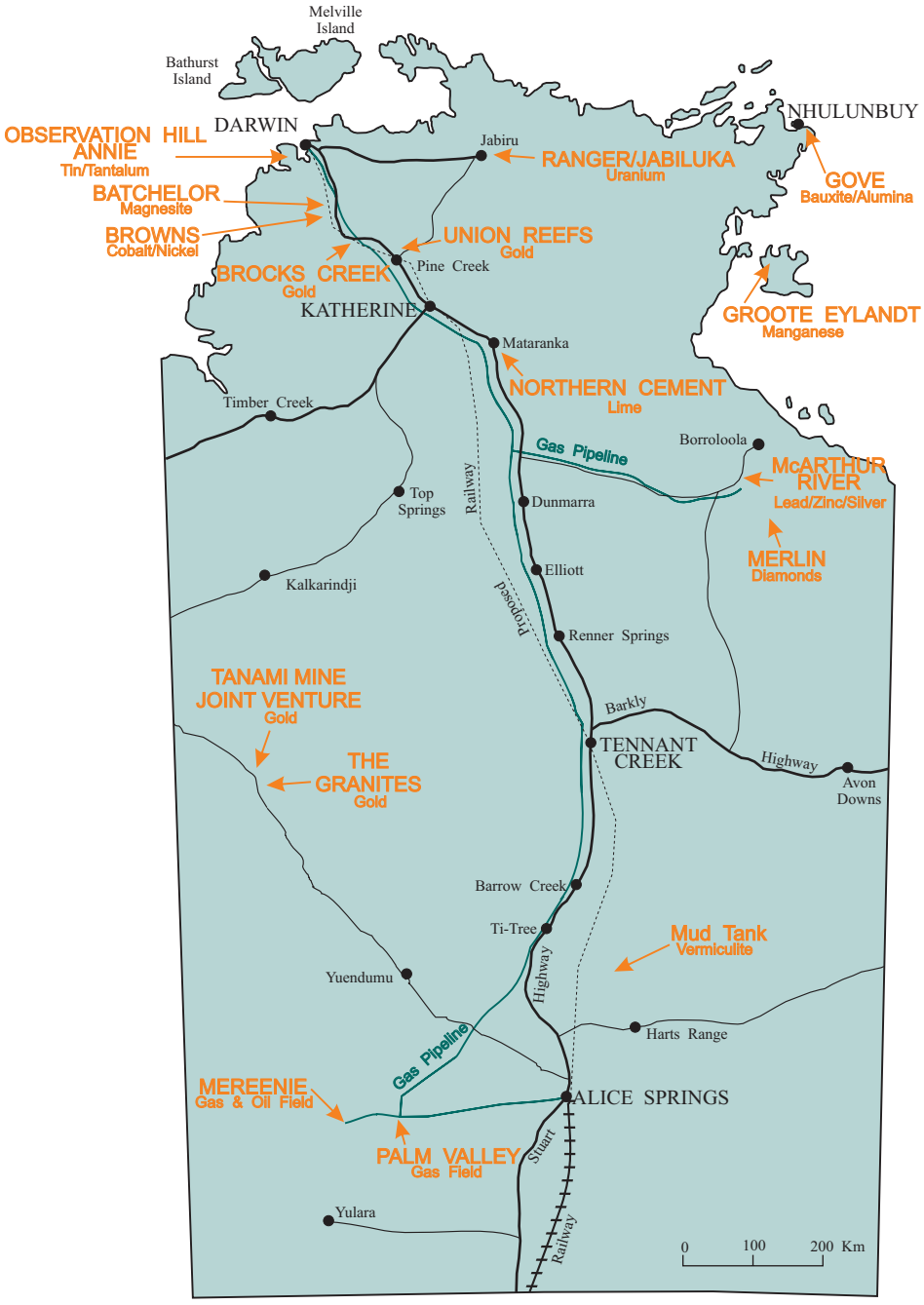
MINERAL AND ENERGY PRODUCTION AND PROCESSING



Source: Department of Mines and Energy, Office of Resource Development

e: estimate *f*: forecast

ONSHORE MINERAL AND ENERGY RESOURCES



(GDP) in 1998-99 and 1% to employment. For 1998-99, the Australian Bureau of Statistics' (ABS) industry employment survey reported 2 500 Territorians as being employed in the mining industry. In addition, significant numbers of interstate and overseas residents are employed on Territory and Timor Sea mineral and energy production and exploration projects. The Office of Resource Development estimates employment at Territory mines and on Timor Sea oil and gas projects at 5 200.

The Northern Territory Government secures direct revenue from onshore mining operations through royalties levied on a profit basis. Profit based royalties fluctuate from year to year, in line with company performance. Royalty revenues for 1999-00 are estimated at $24.4 million. A further $2.2 million is expected from the Commonwealth as a grant in lieu of uranium royalties. However, the Northern Territory Government does not benefit directly from Timor Sea royalties or resource rent tax, all of which accrue to the Commonwealth Government.

In 1998-99 the total value of mineral and energy production in the Territory decreased $95 million to $1 545 million, a fall of 5.8%. Value of mineral production (excluding uranium) fell $106 million (8.2%) to $1 190 million, while oil and gas value of production fell $42 million (23.0%) to $141 million as both production and realised oil prices fell. Uranium oxide value of production increased 33.8% to $214 million.

In 1999-00 it is estimated that the value of mineral and energy production will increase. Mineral production is estimated to be up 19% to $1.42 billion, primarily due to increased gold production and improvements in general commodity prices, most notably alumina. The value of energy production is estimated to more than quadruple as oil prices remain high and production from the Laminaria-Corallina field in the Timor Sea commences.

MINERALS

The Territory's most significant known metallic and non-metallic mineral resources are:

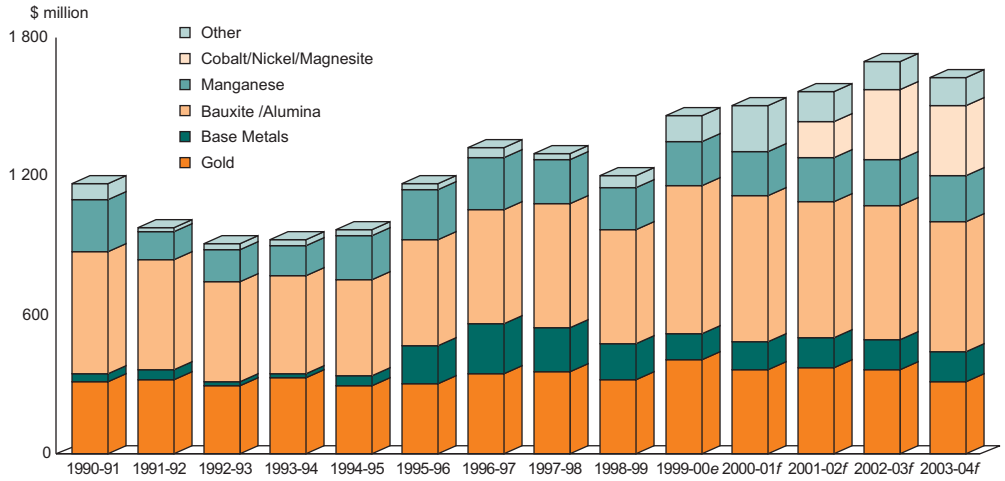
- bauxite - the third largest bauxite mine in Australia near Gove;
- gold - major operating mines are located in the Pine Creek and Tanami Desert areas;
- manganese - Groote Eylandt is the world's third largest producer of high grade manganese ore;
- zinc, lead and silver - including one of the world's largest known ore bodies at McArthur River;
- deposits of garnet sands and vermiculite;
- magnesite – a major deposit in the Batchelor area
- cobalt and nickel – a major polymetallic deposit in the Batchelor area; an d
- diamonds - the Merlin diamond mine operates in the Borroloola region.

The value of metallic and non-metallic mineral production in the Territory is underpinned by the world class deposits at Gove, Groote Eylandt and to a lesser extent, McArthur River. During 1998-99 these mines accounted for almost 65% of the Territory's value of metallic and non-metallic mineral production. It is expected that these deposits will dominate value of production into at least the near future.

Near Tennant Creek gold mining and stockpile ore processing ceased at the White Devil mine. In central Australia, operations at the White Range gold mine were

Figure 8.2

MINERAL PRODUCTION AND PROCESSING



Source: Department of Mines and Energy, Office of Resource Development

e: estimate *f*: forecast

suspended in May 1999. In line with the *Mine Management Act*, White Devil, Gecko and Woodcutters minesite closures are being rehabilitated at a cost of approximately $35 million.

Figure 8.2 shows the value of mining production for 1998-99 decreased 8.2% to $1 190 million. This was the result of falls in production rates and / or realised prices for many commodities. Production quantities fell marginally for bauxite and gold, while lead, zinc and copper production fell significantly. Alumina and lead / zinc concentrate were the only metallic minerals to significantly increase production. Prices for alumina, lead and zinc fell as world demand eased. Gold, bauxite, zinc / lead concentrate and copper prices increased during the period.

In 1998-99 value of gold production was $320 million, accounting for 27% of the value of mineral production. The closure of the White Devil gold mine and the earlier suspension of mining at White Range accounted for about 8% of the reduction. Tom's Gully and Yimuyn Manjerr (formerly Mount Todd) mines commenced operations early in 1999-00. Major gold mines are Union Reefs, Brocks Creek, Granites and Tanami. Although the average gold price increased by 2.4% over 1998-99, a 12.6% decrease in production saw the value of gold production fall by $38 million.

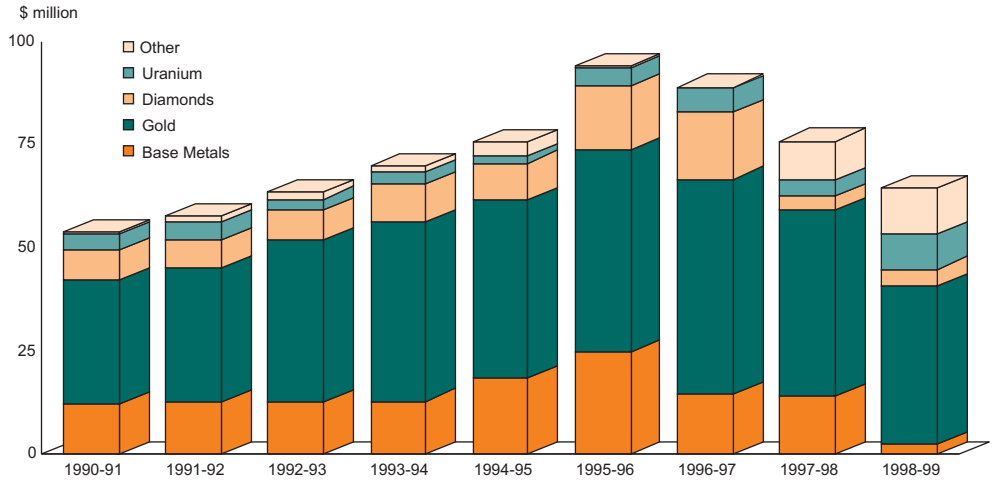
The production value of non-metallic minerals increased from $12 million to $37 million in 1998-99. The large increase was primarily attributable to the first year of production of diamonds from the Merlin mine. Merlin production was valued at over $9 million. Vermiculite production and extraction of construction materials (for East Arm Port and building activity) also experienced significant growth.

MINERAL EXPLORATION

Territory mineral exploration (including uranium) expenditure fell 15% to $64.4 million in 1998-99 in line with the national trend. Exploration expenditure declined in all States, and Australia experienced a 21% decrease. In the Territory gold was again the

Figure 8.3

MINERAL EXPLORATION



Source: ABS Cat. No. 8412.0

commodity attracting the most exploration activity, accounting for almost 60% of expenditures in 1998-99. Approximately 7.1% of Australian exploration expenditures were in the Territory during 1998-99.

Estimates suggest both national and Territory mineral exploration expenditure will remain subdued in 1999-00. Australia's recent decline as a destination for exploration activity is largely attributed to lower world commodity prices, native title uncertainties, greater worldwide competition for exploration funds and significant changes in the productivity of exploration and mining operations.

Greenfields exploration (exploring in new regions) expenditure in the Territory fell 34% to $21 million in 1998-99. A further fall is estimated for 1999-00. Brownfields exploration (exploring around existing mine sites) is generally favoured over greenfields exploration due to cost and land access considerations. Brownfields exploration expenditure increased marginally to $44 million in 1998-99. Declining exploration expenditure is a serious concern as there is generally a period of 10-15 years between the discovery of an orebody and production.

In response to mineral exploration declining over 35% in the past three years, the Territory Government has implemented a major exploration stimulation program to attract exploration investment. The Northern Territory Exploration Initiative has funding of $16 million over five years to dedicate to accelerating airborne geophysical survey programs and producing high quality geoscientific data sets over prospective terrains. 2000-01 is the second operational year for the Exploration Initiative.

The Initiative's programs are designed to provide geoscientific information packages aimed specifically at stimulating mineral exploration. This year it will involve five major airborne geophysical surveys throughout the NT, multi-disciplinary studies of under-explored geological regions, development of predictive mineralisation models in the Tennant Creek, Tanami, and other greenfield areas, and the production of comprehensive digital

datasets in modern geographic information system format.

The focus of field studies in 2000-01 will be on the Territory-wide terrain north of Alice Springs called the Arunta Geological Province.

MINERALS OUTLOOK

The general outlook for minerals is determined largely by world prices. During 1999 there was a remarkable recovery in mineral prices, except gold, on world markets. Strong world economic growth especially in Asia's recovering economies resulted in higher commodity demand and prices. Mineral prices are expected to strengthen further in 2000-01, followed by an easing over the period to 2004-05.

World gold prices remained at historically low levels during 1999, averaging $US279 an ounce (the lowest average annual gold price since 1972). The Australian Bureau of Agriculture and Resource Economics forecasts Australian gold prices to fall 5% in 2000 followed by a 2% increase in 2001. Prices in the medium term to 2005 are projected to steadily decline as supplies from new lower cost mines and bank sales expand faster than demand. Territory production is estimated to increase by 24% in 1999-00 as a result of new and increased production.

Worldwide base metals consumption is forecast to grow strongly to 2001 before settling to more sustainable rates. Increased consumption and low stocks are expected to increase prices. Beyond 2001, copper and lead prices are projected to remain firm and zinc prices to ease temporarily.

The final feasibility study of the Browns orebody (cobalt, nickel, copper and lead) is expected to lead to production in 2002. Feasibility studies of the Batchelor magnesite orebody are also expected to lead to development, with production in 2002.

The strong recovery in aluminium and alumina prices is expected to continue to 2001. After 2001, Australian and world prices are projected to steadily fall as production begins to outpace consumption and stocks grow. This augurs well for the short to medium term prospects for bauxite mining and alumina processing in the Territory, with strong value of production growth estimated for 1999-00.

The demand for crushed rock, gravel, sand and soil is expected to increase significantly with continued urban expansion, extensions to the new Darwin Port and the building of the Darwin to Alice Springs railway.

Current exploration activity near Tennant Creek has the potential to reinvigorate the gold industry in the region. Of particular significance is the discovery of the Chariot deposit, and the entry of two major multinational companies to the area. Exploration in the Tanami region should significantly extend the life of the mines in the Tanami desert. With exploration, the Tanami region is now an emerging gold province of global significance.

A major source of uncertainty and concern in the mining industry has been the inability of the Government to issue valid tenure for exploration and mining on pastoral land following the Wik Decision. The Territory Government had stopped issuing mining titles on pastoral leases in December 1996. In a policy change, following Senate rejection of proposed Territory legislation, the Government decided in March 2000 to process more than 1 000 exploration and mining title applications using the Right to Negotiate provisions of the Commonwealth *Native Title Act*. The impact on exploration and mining activity remains unknown at this stage.

Given the global outlook, mineral production trends in the Territory are expected to result in value of production of $1 422 million in 1999-00, a 19% increase on 1998-99. Value of mineral production is forecast to increase to $1 652 million by 2002-03, due to production from Merlin, Browns Prospect and the Batchelor Magnesite projects. The short-term forecast is that metallic and non-metallic minerals in the Territory will be characterised by an increasing value of production, new mine commissionings and brownfields exploration activity.

The decline in greenfields exploration is forecast to continue in the short term. As results of the Northern Territory Exploration Initiative are disseminated and land access becomes more certain, it can be expected that medium to long term prospects for greenfield exploration in the Territory improve.

ENERGY

The Territory's significant known energy resources are:

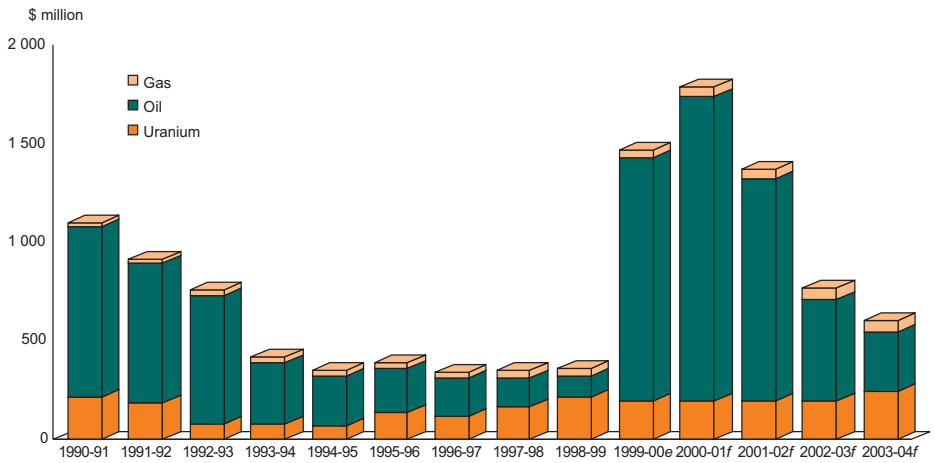
- uranium - deposits at Ranger, Jabiluka and Koongarra;
- natural gas - onshore at Palm Valley and Mereenie and large reserves offshore at Greater Sunrise, Evans Shoal, Petrel and Bayu-Undan in the Zone of Cooperation - Area A (ZOC-A);
- oil - onshore production at Mereenie and offshore production at Jabiru, Challis, Laminaria / Corallina and Elang / Kakatua in the Timor Sea.
- condensate – offshore reserves at Bayu-Undan and Greater Sunrise

The gross value of energy production in the Territory in 1998-99 increased 3.5% to $355.4 million. Increased value of production for uranium offset falling value of crude oil production. Figure 8.4 shows actual and forecast value of oil, gas and uranium production for the period 1990-91 to 2003-04.

Onshore, Mereenie averaged production of 1 683 barrels of oil per day in 1999. Combined gas production from Palm Valley

Figure 8.4

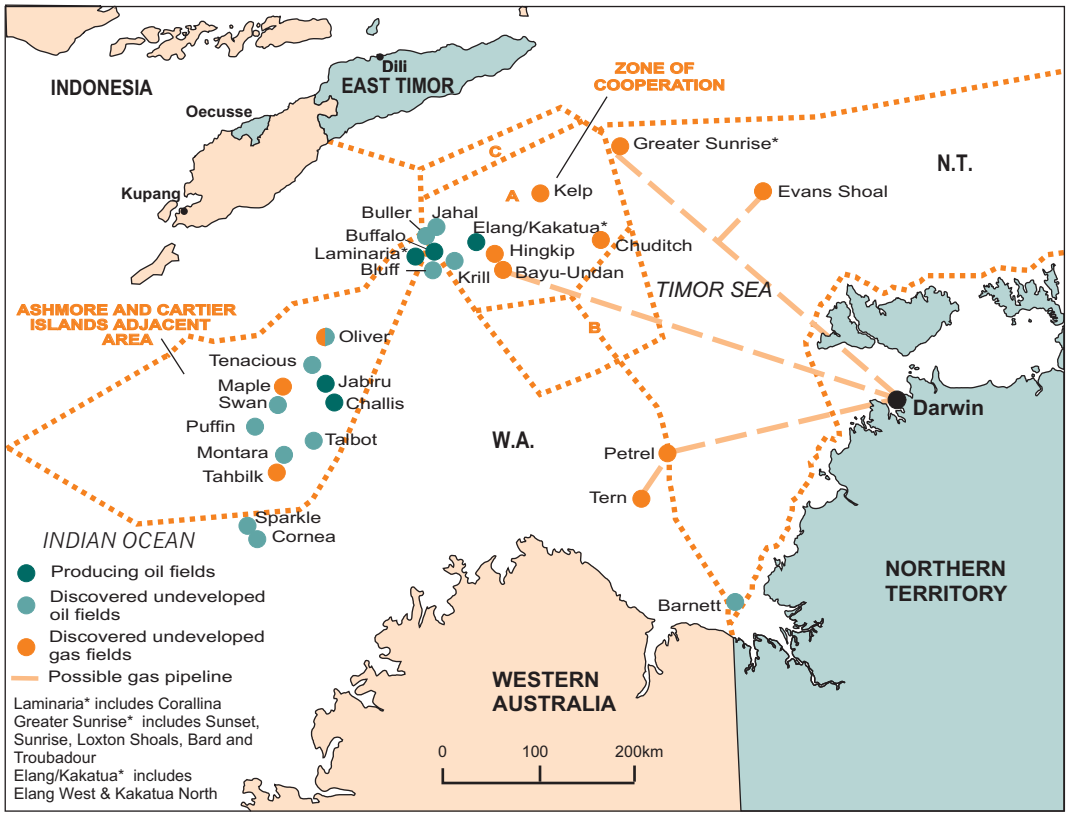
ENERGY PRODUCTION



Source: Department of Mines and Energy, Office of Resource Development

e: estimate *f*: forecast

TIMOR SEA OIL AND GAS



and Mereenie fields was 50 million cubic feet per day in 1999. Production from Palm Valley has been lower than anticipated in recent years and Mereenie is meeting these shortfalls. At the Mereenie field, the gas plant has recently been expanded. Two wells were drilled at Mereenie in 1999 to increase gas delivery capacity.

Timor Sea, to the north and west of the Territory, contains world scale oil and gas reserves. Oil and gas exploration and production activities in the Timor Sea are administered by three jurisdictions. The Territory administers Territory and adjacent offshore waters as well as the Commonwealth waters around the Ashmore and Cartier Islands.

The Commonwealth and United Nations on behalf of East Timor, jointly administer the ZOC-A. This area includes the Elang/Kakatua oil fields, the Bayu-Undan gas-condensate field and part of the North Australian Gas Venture's Greater Sunrise field. Western Australia administers part of the Bonaparte and Browse basins in the Timor Sea.

On 6 November 1999 the $1.4 billion Laminaria/Corallina oil fields commenced production. These fields have estimated proven and probable reserves of 193 million barrels and a production life of twelve years. Oil from the fields is processed and stored on board the Northern Endeavour, the world's largest floating production storage offtake vessel. Production will peak at

120 000 barrels per day for about two years before starting to decline.

The Jabiru facility has well exceeded its initial life expectancy and recently produced its 100 millionth barrel of oil. Jabiru's average production during 1999 was approximately 4 500 barrels per day. The Challis / Cassini oil fields averaged production of 3 700 barrels per day during 1999 as new water injection technology extended the fields' life. The future of these fields is dependent upon the success of efforts to boost economically recoverable reserves.

On 29 December 1999 oil production commenced from the Buffalo field. While this field is just inside West Australian waters, the Territory benefits from supply and service requirements. Current reserves give Buffalo an economic life of approximately three years. Peak production is forecast at 40 000 barrels per day.

ENERGY EXPLORATION

Despite the dramatic rise in crude oil prices since the December 1998 low of $US10 per barrel, offshore exploration commitments are yet to respond. A moderate level of offshore exploration is forecast in the medium term, driven by pre-existing work commitments.

Eight wells were drilled in Territory administered offshore areas during 1999 although no discoveries were made. Current commitments will see a further sixty-five wells drilled over the period to 2004. Thirteen wells are committed for 2000. With current commitments, offshore exploration will peak in 2001 with twenty-three wells. Drilling activity is forecast to decline sharply after 2001.

Other exploration wells to be drilled in the Timor Sea over the period to 2004 include thirty-four wells in Western Australia administered waters and eleven wells in ZOC-A administered waters. It can be expected that all operations in the Timor Sea will utilise logistical and support facilities in the Territory.

Onshore exploration activity has been weak. Native title uncertainty has had a marked effect on greenfield oil and gas exploration in the Territory. Including activity on production and retention titles, drilling activity has been only three to four wells per year. However, the Department of Mines & Energy currently holds 13 applications for onshore exploration permits involving expenditure commitments of $75 million.

The Northern Territory Exploration Initiative is also focussing on unlocking the Territory's onshore oil and gas potential. Work during 2000 will build on stratigraphic drilling and airborne surveys undertaken in the Georgina Basin during 1999, with full analysis of hydrocarbon and mineral fluid systems. Further drilling will provide a framework for potential resources such as phosphorite, lead and hydrocarbons. Hydrocarbon generation modelling will be undertaken in the prospective western Amadeus Basin.

Uranium exploration expenditure, concentrated in Western Arnhem land, increased to $8.6 million in 1998-99.

ENERGY OUTLOOK

As Figure 8.4 shows, the outlook for energy developments in the Territory remains buoyant in the short to medium term. Value of energy production is estimated at $1 470 million in 1999-00. The quadrupling of production value is primarily attributable to higher oil prices and Laminaria-Corallina beginning production. A further 22% increase is forecast for 2000-01 as Laminaria-Corallina has its first full year of production. Energy forecasts do not include the possible exploitation of gas reserves in the Timor Sea.

Beyond 2000-01 annual production value is expected ease for the remainder of the forecast period.

The value of uranium production in the Territory is expected to strengthen between 1999-00 and 2003-04 due to increased production. Production of uranium oxide from Jabiluka is dependent on decisions regarding milling of ore at either Jabiluka or Ranger. The preferred development option of trucking the ore to the Ranger mill is currently subject to a five-year moratorium by the Northern Land Council on behalf of traditional owners. Reserves at Jabiluka are estimated as sufficient to maintain production for nearly three decades.

The value of gas production is expected to increase at a moderate rate over the forecast period. In the longer term large increases in the value of gas production are likely, but dependent on securing gas markets and consequent development of identified gas resources.

Gas production forecasts for the Mereenie and Palm Valley gas fields are essentially demand forecasts. Assuming no demand shocks, demand is forecast to increase at around 2% per year. If supply can be guaranteed, gas could the major energy source for the potential Browns project and Batchelor magnesite developments.

The price of crude oil, which peaked in March 2000 at $US32, fell to a more sustainable $US23.50 by late April 2000. The key factor in determining oil prices in the short term will be the actions of the Organisation of Petroleum Exporting Countries (OPEC). If OPEC increases production, prices could be expected to decline further in the short term. In the medium to long term, any sustained increase in margins could be expected to attract new investment in oil exploration and production. Australian crude oil and condensate production is expected to peak at 630 000 barrels per day in 1999-00, with little change in 2000-01.

New offshore oil and gas projects under feasibility study include development of the Bayu-Undan gas phase, Petrel/Tern, the North Australian Gas Venture and a number of smaller marginal oil fields.

The Bayu-Undan reserves are estimated to include 400 million barrels of condensate and liquefied petroleum gas (LPG), and more than 3 trillion cubic feet (Tcf) of gas. The ZOC-A Joint Authority has recently approved development of the liquid-stripping phase of Bayu-Undan. First production is expected in late 2003. The joint venture is actively seeking markets for dry gas from the field. Options for gas use include liquefied natural gas (LNG), methanol and related chemicals, and domestic gas markets.

The North Australian Gas Venture encompasses development from Greater Sunrise, Evans Shoal and other potential Timor Sea gas fields. The scope for recovery is estimated at 16.9 Tcf of gas (Greater Sunrise 9.2 Tcf and Evans Shoal 7.7 Tcf) and 321 million barrels of condensate. Priorities for development of the fields have changed, with the venturers targeting large-scale syngas production and the piping of gas to local and interstate markets. This does not preclude later LNG production when export markets are secured.

The operator of the Petrel/Tern gas fields remains optimistic that sufficient gas reserves will be demonstrated to support a domestic gas project.

The development of onshore Timor gas facilities would open new opportunities for the Territory economy. Such opportunities include further processing of gas to LNG and energy intensive chemicals, extensions of natural gas pipelines to other areas of the

Territory such as Gove, and to the rest of Australia, and the generation of cheaper power in the Territory.

Prospects for increased LNG demand in Asian markets continue to improve, mirroring stronger economic conditions generally. However, global LNG supply potential exceeds additional demand forecast over the medium term, creating fierce competition between potential suppliers.

The proposed offshore petroleum developments together with the associated value adding onshore projects offer significant economic benefits to the Northern Territory, particularly through employment and the supply of goods and services. With current projects there is significant leakage of benefits from the Territory, particularly to Western Australia. This is primarily due to the use of fly-in fly-out staffing and purchasing through Perth offices. The situation is being addressed with efforts underway to market Darwin to operators as an effective place to base staff and undertake purchasing activities.