

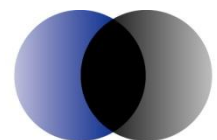
# Northern Territory

## **Vision 2020 Project: The Australian Minerals Industry's Infrastructure Path to Prosperity**

An assessment of industrial and  
community infrastructure in major  
resources regions

Prepared for the Minerals Council of Australia

**May 2009**



**ACIL Tasman**

Economics Policy Strategy

© ACIL Tasman Pty Ltd

This work is copyright. The *Copyright Act 1968* permits fair dealing for study, research, news reporting, criticism or review. Selected passages, tables or diagrams may be reproduced for such purposes provided acknowledgment of the source is included. Permission for any more extensive reproduction must be obtained from ACIL Tasman on (03) 9600 3144.

### Reliance and Disclaimer

The professional analysis and advice in this report has been prepared by ACIL Tasman for the exclusive use of the party or parties to whom it is addressed (the addressee) and for the purposes specified in it. This report is supplied in good faith and reflects the knowledge, expertise and experience of the consultants involved. The report must not be published, quoted or disseminated to any other party without ACIL Tasman's prior written consent. ACIL Tasman accepts no responsibility whatsoever for any loss occasioned by any person acting or refraining from action as a result of reliance on the report, other than the addressee.

In conducting the analysis in this report ACIL Tasman has endeavoured to use what it considers is the best information available at the date of publication, including information supplied by the addressee. Unless stated otherwise, ACIL Tasman does not warrant the accuracy of any forecast or prediction in the report. Although ACIL Tasman exercises reasonable care when making forecasts or predictions, factors in the process, such as future market behaviour, are inherently uncertain and cannot be forecast or predicted reliably.

ACIL Tasman shall not be liable in respect of any claim arising out of the failure of a client investment to perform to the advantage of the client or to the advantage of the client to the degree suggested or assumed in any advice or forecast given by ACIL Tasman.

## ACIL Tasman Pty Ltd

ABN 68 102 652 148

Internet [www.aciltasman.com.au](http://www.aciltasman.com.au)

### Melbourne (Head Office)

Level 6, 224-236 Queen Street  
Melbourne VIC 3000

Telephone (+61 3) 9600 3144  
Facsimile (+61 3) 9600 3155  
Email [melbourne@aciltasman.com.au](mailto:melbourne@aciltasman.com.au)

### Darwin

Suite G1, Paspalis Centrepoint  
48-50 Smith Street  
Darwin NT 0800  
GPO Box 908  
Darwin NT 0801

Telephone (+61 8) 8943 0643  
Facsimile (+61 8) 8941 0848  
Email [darwin@aciltasman.com.au](mailto:darwin@aciltasman.com.au)

### Brisbane

Level 15, 127 Creek Street  
Brisbane QLD 4000  
GPO Box 32  
Brisbane QLD 4001

Telephone (+61 7) 3009 8700  
Facsimile (+61 7) 3009 8799  
Email [brisbane@aciltasman.com.au](mailto:brisbane@aciltasman.com.au)

### Perth

Centa Building C2, 118 Railway Street  
West Perth WA 6005

Telephone (+61 8) 9449 9600  
Facsimile (+61 8) 9322 3955  
Email [perth@aciltasman.com.au](mailto:perth@aciltasman.com.au)

### Canberra

Level 1, 33 Ainslie Place  
Canberra City ACT 2600  
GPO Box 1322  
Canberra ACT 2601

Telephone (+61 2) 6103 8200  
Facsimile (+61 2) 6103 8233  
Email [canberra@aciltasman.com.au](mailto:canberra@aciltasman.com.au)

### Sydney

PO Box 1554  
Double Bay NSW 1360

Telephone (+61 2) 9389 7842  
Facsimile (+61 2) 8080 8142  
Email [sydney@aciltasman.com.au](mailto:sydney@aciltasman.com.au)

## For information on this report

Please contact:

Dr John Söderbaum

Telephone (02) 6103 8200

Mobile 0404 822 302

Email [j.soderbaum@aciltasman.com.au](mailto:j.soderbaum@aciltasman.com.au)

Ian Satchwell

(08) 9449 9612

0404 822 492

[i.satchwell@aciltasman.com.au](mailto:i.satchwell@aciltasman.com.au)

## Contents

<b>1</b>	<b>Vision 2020 Project</b>	<b>1</b>
<b>2</b>	<b>Report overview</b>	<b>3</b>
<b>3</b>	<b>The Northern Territory economy and mining</b>	<b>4</b>
3.1	Current Northern Territory resources production	6
<b>4</b>	<b>The Darwin growth region</b>	<b>8</b>
<b>5</b>	<b>Planned and proposed resources production</b>	<b>9</b>
<b>6</b>	<b>Resources-related demography</b>	<b>10</b>
<b>7</b>	<b>Current and planned infrastructure</b>	<b>12</b>
7.1	Roads	12
7.2	Rail	13
7.3	Ports	16
7.4	Airports	17
7.5	Gas pipelines	18
7.6	Electricity	19
7.7	Telecommunications	20
7.8	Community infrastructure	20
7.9	Infrastructure planning and issues	20
<b>8</b>	<b>Growth scenario and infrastructure</b>	<b>22</b>
8.1	Growth scenario, Darwin region	24
8.1.1	Mineral production and export	24
8.1.2	Resources services	25
8.1.3	Oil and gas development	25
8.1.4	Infrastructure requirements	25
8.2	Infrastructure impediments	29

### List of figures

Figure 1	NT - Onshore mineral and energy resources	6
Figure 2	Location of the Darwin region	8

### List of tables

Table 1	Mineral production Northern Territory, 2007-08	7
Table 2	Employment by industry – Darwin region	10
Table 3	Potential for rail to support mining operations	15
Table 4	Summary of growth scenario to 2020 for the NT and Darwin growth region	22
Table 5	Summary of infrastructure gaps and requirements under the growth scenario to 2020 for the Darwin region and associated supply chains	23

# 1 Vision 2020 Project

This report forms part of the Mineral Council of Australia's Vision 2020 Project – a long term study into the needs of, and opportunities for, the Australian minerals industry. The project examines existing and potential capacity constraints in ports, railways and roads; energy, telecommunications and water networks; as well as housing, labour and other social needs that affect the growth of the mining industry and the wellbeing and development of the communities in which it operates across Australia. It considers the potential for growth in 21 Australian resources regions under a scenario that broadly aligns with the Advance scenario outlined in an earlier report prepared as part of the Vision 2020 Project and assesses the need for infrastructure to support that growth.<sup>1</sup> Separate reports have been prepared for each State and the Northern Territory.

While the main focus of the work is on the minerals industry, the reports for individual growth regions have, in some cases, also considered the growth outlook for other industries. In particular, other industries have been considered in regions where they are important competitors for access to infrastructure, or where their needs are complementary to those of the mining industry.

Expansion of the nation's infrastructure (hard and soft industrial and community infrastructure) has not kept pace with the rapid and sustained growth in export and domestic demand. Consequently, Australia now has significant infrastructure constraints. This in turn has reduced Australia's ability to meet the global demand for mineral products. Other nations have moved to fill that gap and as a consequence Australia's market share has fallen.

The ultimate objective of the Vision 2020 Project is to encourage the establishment of the policy and regulatory frameworks that will enable the timely provision of the industrial and community infrastructure needed to support an increase in Australia's minerals production capacity. It is hoped that this in turn will enable Australia to rebuild its share of the global minerals market.

The Vision 2020 Project's growth scenarios were prepared prior to the emergence of the global economic crisis. While the strong negative impacts on global growth and demand are already clearly evident, most commentators believe that those impacts are likely to largely play out over next 6-18 months.

---

<sup>1</sup> Two reports were produced by Access Economics: *Infrastructure 2020 – Can the domestic supply chain match global demand?* and *Global commodity demand scenarios*.



**ACIL Tasman**

Economics Policy Strategy

**Vision 2020 Project: The Australian Minerals Industry's Infrastructure Path to Prosperity**

ACIL Tasman believes that robust economic conditions will return within that timeframe, and that growth is likely to return to longer term trend lines. The Asian markets in particular, with their innate demand driven by large, aspirational populations, are likely to bounce back quickly and strongly.

This report examines growth scenarios for Northern Territory mining and gaps in infrastructure for the Darwin region and supply chains linked to it. It draws on the results of a range of existing studies.

## 2 Report overview

Mining, including petroleum, contributes almost a quarter of the economic activity in the Northern Territory. Industry investment and production have expanded rapidly in recent years, and are forecast to grow further during the next decade.

The Darwin region is the logistics, services and personnel hub for the Northern Territory mining industry. Darwin is also growing as an export port, currently for Northern Territory mines and in the future for several South Australian mines. The rapid growth of activity mining-related activity and population in the Darwin region is placing strains on both industrial and community infrastructure.

Ongoing growth and proposed new developments such as the INPEX LNG project will generate major new demands for residential land, industrial land, roads, rail and port facilities, utilities, and health and education facilities. In remote areas, community, transport and telecommunications infrastructure and services are of patchy standard.

Major new infrastructure investment is required to meet both the direct and indirect requirements of the mining industry now and under future growth scenarios. Investment in all classes of infrastructure is required. In particular, investment in road, rail and port infrastructure is needed to allow the industry to export its products.

Infrastructure deficits in roads, utilities and community infrastructure have resulted from past under-investment in both new infrastructure and repairs and maintenance. New investment and additional investment in repairs and maintenance are required to overcome deficits.

Investment in community infrastructure is needed to attract and retain workers both in the mining industry and in the industries that service it, and to contribute to greater community wellbeing in the NT.

A summary of infrastructure gaps now and in the future, and upgraded and additional infrastructure required is set out in Table 5.

### 3 The Northern Territory economy and mining

The Northern Territory economy is growing strongly. State Final Demand (SFD)<sup>2</sup> increased 3.4 per cent in the fiscal year 2007-08, up from the previous year's growth rate of 2.2 per cent.<sup>3</sup> Mining (including petroleum) was a key driver of, and the largest private sector contributor to this growth. In 2007-08 the value of mineral and petroleum production was \$5.6 billion.

Mining accounted for 24.5 per cent of Gross State Product GSP<sup>4</sup> in 2006-07, more than three times the national contribution of 7.0 per cent. The Northern Territory hosts a number of large scale mining operations, including:

- Gove bauxite and alumina operations operated by Rio Tinto Alcan
- Groote Eylandt manganese operations of BHP Billiton
- McArthur River base metal mine, operated by Xstrata
- ERA's Ranger uranium operations
- Newmont's Tanami gold operations.

In addition, a number of smaller mines operate in several regions (see Figure 1). The resources sector's economic contribution is boosted by major petroleum projects, including the Laminaria-Corallina oilfield in the Timor Sea, and gas and condensate production from Bayu-Undan, feeding the Darwin LNG plant.

The growth outlook for minerals and petroleum is strong. A number of new and expanded mines are proposed, including iron ore, gold, rare earths and phosphate. INPEX is proposing to build an LNG plant in Darwin. The Adelaide to Darwin railway is set to provide a valuable transport link for mineral products from both the NT and South Australia.

Strong growth in economic activity and employment is a driver of population growth. The estimated population of the Northern Territory is 221,000, with annual growth of 2.2 per cent, which is well above the national growth rate.

---

<sup>2</sup> State Final Demand (SFD) is an important measure of economic activity. It is an estimate of the level of spending in the local economy by the private and public sectors. Spending is reported on the basis of consumption of goods and services, and capital investment.

<sup>3</sup> This report draws from several Northern Territory Government publications – 2009-10 Budget papers, mining production and outlook publications by the Department of Regional Development, Primary Industry, Fisheries and Resources, and company reports.

<sup>4</sup> GSP is a measure of the value added by economic production in States and Territories. It differs in concept from SFD in that it measures "value added" rather than total final expenditure.

Economic forecasters predict a slowing of growth in the five years to 2012-13 due to the impact of the global financial crisis. A major new project, such as the proposed INPEX LNG project, which is proposed to commence construction by end 2010, should lead to a return to high growth rates. As mineral prices recover, minerals production growth is expected to resume.

Infrastructure in the Darwin region is struggling to cope with the demands of industry and rapidly growing population. The following sections examine infrastructure adequacy currently and under three growth scenarios.

Mineral exploration has increased in the Northern Territory in recent years, fuelled by strong commodity prices and demand, particularly from China. During 2007- 2008, private mineral exploration grew 43 per cent, up to \$132 million. Expenditure on uranium was the main driver, contributing almost 20 per cent to total expenditure growth followed by gold and copper.

Exploration for minerals and on-shore petroleum has been boosted by high minerals prices, improving relationships with Aboriginal landowners and the NT Government's innovative Bringing Forward Discovery program, involving a range of initiatives to attract exploration investment.

Exploration for onshore and offshore oil and gas has increased seven-fold in the last four years.

A relatively high proportion of Territory GSP is attributed to defence services and government administration. This reflects the scale of the Defence presence in the Territory and the diseconomies of scale associated with providing public services to a small and dispersed population combined with the high needs of the Territory's relatively large Indigenous population.

Figure 1 **NT - Onshore mineral and energy resources**



Source: Northern Territory Economy, Budget 2008-09

### 3.1 Current Northern Territory resources production

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 the Territory in 2007-08. These three mines are expected to continue to dominate production in the medium term. The value of total mineral production is expected to reach \$2.5 billion in 2007-08.

Table 1 **Mineral production Northern Territory, 2007-08**

Product	2007-08 Value	2007-08 Quantity
Alumina	516 956 253	2 150 310 t
Bauxite	267 256 793	5 250 989 t
Gold	322 234 761	13 574 910 g
Iron ore	56 844 535	741 055 t
Manganese	937 911 128	3 727 470 t
Mineral sands concentrate	10 764 706	24 400 t
Silver	437 110	1 434 799 g
Zinc/lead concentrate	331 584 007	299 616 t
Uranium oxide	423 318 710	5 254 t
<b>Total</b>	<b>2,967,314,003</b>	

*Data source:* Department of Department of Regional Development, Primary Industry, Fisheries and Resources

In 2007/08, gold production value increased 21.7 per cent over 2006/07, bauxite 52 per cent, manganese 10.5 per cent; while lead-zinc production decreased 19.8 per cent.

The significant energy resources in the Territory are oil, uranium, natural gas, LPG and condensate. 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
- 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 2007-08, the value of energy production increased by 2.4 per cent from 2006/07, up to \$3.1 billion (excluding uranium).



## 4 The Darwin growth region

The Darwin region is located in the Top End of the Northern Territory. Its boundaries are shown in Figure 2. Darwin is the focal point for mineral industry logistics and for a growing proportion of the industry's exports. The rail line and major highways lead to the Port of Darwin, which is developing as a major multi-user minerals export port. Many mining and construction workers live in Darwin and commute to remote operations by air.

Figure 2 **Location of the Darwin region**



Data source: ABS

## 5 Planned and proposed resources production

In early 2008, the value of mineral production in the Territory (excluding manufacturing) was forecast to increase by 54.3 per cent to \$3.9 billion in 2008-09. The increase was due largely to a forecast increase in the volume and value of manganese and iron ore production as well as increases in gold and lead-zinc output. The value of energy production was 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

Actual production is expected to be lower than these forecasts due to softening markets as a result of the global financial crisis, but strong growth will return when markets rebound in the next two years.

Manganese production is expected to increase strongly the two current mines and a potential new operation. Iron ore production from the Frances Creek operation and possible new mines will grow. Base metal production will increase from the McArthur River Mine, and the Browns polymetallic project near Batchelor is expected to open. Several new or reopened gold projects will lift gold production. A new rare earths mine north of Alice Springs will feed a processing plant that is expected to be built in Darwin. Uranium production is expected to grow, from the existing Ranger operation and from one or two new mines. Phosphate production from the proposed Wonarah mine is expected to be exported through Darwin.

The Darwin LNG operations will continue to operate at capacity of 3.5 Mtpa. INPEX is undertaking final studies for an 8.2 Mtpa LNG project in Darwin. Woodside remains committed to the development of the Greater Sunrise gas field, but 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 or on a floating vessel in the Timor Sea. Other offshore oil and gas projects are also expected to be developed. Increased onshore petroleum exploration could result in discoveries of oil and gas.

Gas from the offshore Blacktip field is planned to flow in 2009 and will meet the Territory's long term domestic gas requirements. Backup supply is being obtained via construction of a pipeline from the Darwin LNG plant that will interconnect with the existing Amadeus Basin to Darwin gas pipeline. This pipeline is expected to be completed by May 2009.

The outlook for develop of resources projects and for production is therefore very strong, generating a consequential demand for services, workers and infrastructure.

## 6 Resources-related demography

The Northern Territory is sparsely populated, with a density of 0.16 persons per square kilometre, lower than any other jurisdiction and well below the national density of 2.68 people per square kilometre.

More than three-quarters of the Territory's population live in the six main town centres. The Darwin region accounts for 54 per cent of the Territory's population. Alice Springs accounts for 12 per cent, while the other regional town centres (Katherine, Nhulunbuy, Tennant Creek and Jabiru) together account for just 9 per cent.

About 25 per cent (or 52,000) of the Territory's resident population live outside major regional centres and are therefore considered to live in a 'remote' area. Of this total, 42,000 (81 per cent) people are Indigenous.

This pattern of settlement, particularly for non-Indigenous people, is related to employment opportunities such as in government administration, defense and construction in Darwin, hospitality and other service industries around Alice Springs. The influence of mining and service industries in these and other Territory towns is likely to increase in the future.

Employment data by industry for the Darwin region is shown in Table 2. ABS-reported employment data does not include defense personnel or fly-in fly-out (FIFO) workers and as such it should be considered only indicative of the actual employment.

Table 2 **Employment by industry – Darwin region**

Economic activity	Employment	per cent
Public administration & safety	11,476	21.16
Retail trade	5,241	9.66
Education & training	4,579	8.44
Health care & social assistance	4,447	8.20
Construction	4,243	7.82
Accommodation & food services	3,239	5.97
Professional, scientific & technical services	2,871	5.29
Transport, postal & warehousing	2,859	5.27
Manufacturing	2,595	4.78
Other services	2,056	3.79
Wholesale trade	1,678	3.09
Administrative & support services	1,650	3.04
Arts & recreation services	1,176	2.17
Financial & insurance services	1,059	1.95
Rental, hiring & real estate services	982	1.81

Economic activity	Employment	per cent
Information media & telecommunications	908	1.67
Mining	845	1.56
Agriculture, forestry & fishing	720	1.33
Electricity, gas, water & waste services	357	0.66
<b>Total</b>	<b>54,236</b>	

*Data source: (Australian Bureau of Statistics, 2006)*

The Territory labour market continued its strong performance in 2007-08, with estimated resident employment growth of 4.8 per cent and an estimated average unemployment rate of 4.5 per cent (up from 3.8 per cent in 2006-07). Related indicators point to continued strong employment growth and ongoing shortages of skilled labour across many sectors.

Employment in the Territory is very much service-oriented. Service industry jobs account for almost 90 per cent of employment in the Territory, compared to just over 80 per cent nationally. The largest employers are retail trade, government administration, health, education, construction, maintenance and property and business services. Many service sector businesses and their employees provide services to the mining industry.

Reflecting the Territory's abundant mineral and energy resources, the proportion of people employed in the mining industry is almost twice as high as it is nationally, at 2.0 per cent, although lower than in 1996 when mining accounted for 3.5 per cent of Territory employment. Given record commodity prices and exploration expenditure in the Territory in the past three years, further growth in mining activity and employment is expected in the future.

A continued high rate of employment growth of 2.5 per cent is expected for 2008-09, underpinned by residential and commercial construction and work on mining projects, and continued migration and tourism growth. The proposed INPEX LNG project is expected to provide a large boost to workforce demand in the next five years.

## 7 Current and planned infrastructure

As noted earlier, the Northern Territory faces some unique infrastructure challenges with a geographically large jurisdiction, small population, long distances, rapid growth and limited financial resources. This section describes the status of current infrastructure and discusses its adequacy.

### 7.1 Roads

As the Territory economy continues to grow, so too does the need for transport and storage, and transport infrastructure. Transport and storage contributes about 4 per cent to the Territory's Gross State Product (GSP).

The national highway network is the backbone of the road network system across the Territory and provides the only sealed road links between the Territory and the rest of Australia. The Territory is served by three national highways which provide links to Queensland (Barkly Highway), South Australia (Stuart Highway) and Western Australia (Victoria Highway).

While these highways are of reasonable standard, their reliability is sometimes poor in periods of very high rainfall. The extended closure of the Barkly Highway in early 2009 due to flood damage caused major disruption to supply chains for Northern Territory industry and the population.

In 2007-08, AusLink expenditure on roads in the Territory was \$46 million.

The remainder of the Territory road network consists of more than 36,000 kilometres of sealed and unsealed roads. About 22,000 kilometres are managed by the Territory Government, including 12 per cent classified as national highways, 19 per cent classified as arterial roads and 69 per cent classified as secondary or local roads. The remaining approximately 14,000 kilometres of roads, primarily for distributing traffic within local areas, are administered by local governments.

In 2007-08, Northern Territory Government expenditure on roads was \$77 million.

Total roads expenditure of \$123 needs to be seen in the context of the very lengthy road network and the overall poor condition of regional roads.

The condition of unsealed roads is generally very poor. In the Top End, including the Darwin region, many roads are closed to heavy vehicles in the Wet Season, or are closed completely. This means that transport is restricted to high cost barge for communities and mining operations.

The overall condition of the Territory road network has deteriorated during the past decade. While some roads have been upgraded to better serve mining and tourism industries, repairs and maintenance expenditure has fallen below the level required to maintain the network. As a result, the reliability of roads has declined and their damaging impact on vehicles has increased. This has led to Territory industry and communities facing reduced amenity and higher costs.

Much higher maintenance expenditure is required to maintain the road network, and more capital funding is required to bring roads up to a standard to meet community and industry needs.

Along with maintenance and widening activities, current major works to overcome flooding problems on the Victoria, Stuart and Barkley highways, including bridge works. These works should result in reduced road closures caused by flooding. Improving of community and mining roads such as the Port Keats Road and Tanami Road remains a priority.

In April 2008, it was announced that the Territory Government, in partnership with the Commonwealth, would allocate \$110 million to extend Tiger Brennan Drive. When complete, the work will include a flyover and a 7 kilometre road extension to the Stuart Highway. Extending Tiger Brennan Drive is an important infrastructure project that will support the economic opportunities of East Arm Port, providing better access for trucks and trains to deal with increased transport and freight volumes.

It is important to place road and highway development in the context of the relatively under developed nature of the Territory's regional economies. Consequently, wider community needs such as safety, strategic defence considerations, communications and regional economic development need to be incorporated into any analysis to support roads associated with minerals development – such as the Tanami Road.

## 7.2 Rail

The Adelaide to Darwin railway was completed in January 2004. FreightLink, the railway operator, began rail transport operations with five freight services a week capturing 85 per cent of the competitive interstate freight market within three months of starting up. FreightLink continues to provide the primary linehaul service along Australia's central freight corridor connecting Darwin with freight services in Adelaide and other states. FreightLink now carries 90 per cent of the general freight between Adelaide and Darwin to rail and has four minerals projects as bulk freight clients.

In November 2008, however, high debt levels and the board's inability to obtain all of the required consents for a voluntary sale of the business led to the board appointing a voluntary administrator. The operation of the railway has not been materially affected to date. It is expected, however, that given the financial results of FreightLink's operations, prices for rail transport will need to rise to provide a commercial return for any new investors.

The value of the railway to the development of the Northern Territory economy continues to be demonstrated by results, with a surge to record levels of both bulk and general freight in 2006-07. The railway continues to demonstrate its long-term potential to the economic development of both South Australia and the Northern Territory. The net tonnage carried increased 67 per cent from 668,081 tonnes in 2005-06 to 1,112,885 tonnes in 2006-07.

The railway has acted as a catalyst for the development of the resources sector throughout the Northern Territory and South Australia by offering an alternative cost-effective way to move large quantities of bulk ore and materials for shipment to overseas markets.

Through its subsidiary, OM Manganese Ltd (OMM), OM Holdings Ltd (OMH) operates the Bootu Creek manganese mine, located 110 kilometres north of Tennant Creek. Bootu Creek manganese is mined exclusively for OMH Group's wholly-owned Qinzhou smelter, in south-west China. OMM was the first mine to enter into a contract to haul manganese by rail from the Bootu Creek operation to the Port of Darwin and is expected to produce more than 550,000 tonnes of ore annually for many years.

Territory Resources Ltd's Frances Creek mine near Pine Creek commenced operations in July 2007, with FreightLink carrying iron ore to the Port of Darwin bulk minerals discharge facility at the rate of about 750,000 tpa. Territory Resources aims to build shipments to 2 Mtpa.

Another mining company, OZ Minerals, has announced plans to transport copper concentrate by rail from its Prominent Hill mine, south-east of Coober Pedy, to the Port of Darwin, commencing in 2009. Some 240,000 t of concentrate will be shipped annually.

Minemakers is conducting a feasibility study into the development of the Wonarah phosphate resource east of Tennant Creek. Production rates are projected at 1 Mtpa from 2010 building up to 3 Mtpa by 2011. Initial transport will be by road to Tennant Creek, then by rail to the Port of Darwin. A study is underway to assess the feasibility of a Wonarah – Tennant Creek rail link, which would be required at production rates of more than 3 Mtpa.

Other companies with proposed mining operations in the Northern Territory and South Australia are also in discussion with FreightLink and the Port of

Darwin about rail shipments and export through this port. Table 3 shows potential mining operations which could use rail to move their product to the Port of Darwin.

Notwithstanding the uncertainty about the future ownership of FreightLink, the volumes of mineral products that are expected to be shipped by rail will be a major factor in improving the viability of the railway operations.

FreightLink invested around \$8 million in 2007 and 2008 to provide additional track infrastructure along the corridor and in Darwin, with additional leased rolling stock (defined as engines and wagons) to support the expansion of the minerals business.

Table 3 **Potential for rail to support mining operations**

Company	Project	Location	Product
Territory Iron	Frances Creek	Pine Creek	Iron ore
OM Holdings	Bootu Creek	Tennant Creek	Manganese
Territory Iron	Warrego	Tennant Creek	Magnetite
Peko Rehab	Peko Tailings	Tennant Creek	Magnetite
Arafura Resources	Nolans Bore	Alice Springs	Rare earths
Olympia Resources	Harts Range	Alice Springs	Garnet sands
Altona Resources	Arkaringa	Arkaringa SA	Coal
Goldstream	Cairn Hill	Coober Pedy SA	Magnetite/copper
Goldstream	Peculiar Knob	Coober Pedy SA	Iron ore
BHP Billiton	Olympic Dam	Roxby Downs SA	Copper concentrate

Sources: Department of Regional Development, Primary Industry, Fisheries and Resources, Department of the Chief Minister

In addition to the \$8 million invested in 2007 and 2008 in track infrastructure, additional passing loops are likely to be funded by resource companies to improve the efficiency of the line when projects come on stream. Loading sidings will also be constructed as required under commercial arrangements between FreightLink and mine operators.

Transport of up to 1.6 Mtpa of copper concentrate from the Olympic Dam operations in South Australia would require construction of a line from the mine site to Pimba in South Australia, connecting with the Trans Australia and Adelaide to Darwin lines.

The proposed development of the Wonarah phosphate deposits east of Tennant Creek has prompted the examination of a rail link between the minesite and Tennant Creek to join up with the Adelaide – Darwin rail line. Other phosphate prospects, such as IPL's Phosphate Hill mine near Mount Isa, have also been identified as potential users of a rail link from Queensland

to connect with the line under study. While at this stage, the projected transport task does not appear likely to be sufficient to support a rail link, the region remains relatively unexplored, with potential for additional resources to be identified that could underpin a rail link.

In addition, the potential for bulk zinc concentrate movements out of Mount Isa to Darwin is also the subject of Northern Territory Government attention given the congestion problems experienced at the Townsville port.

### 7.3 Ports

The Port of Darwin is a naturally occurring deep water port, with its main facilities located at East Arm. It is Australia's closest port to South East Asian markets. This strategic geographic location and its transport links will ensure that it plays a fundamental role in future growth of mining exports.

The port facilities at East Arm are connected to the national rail network through the Adelaide to Darwin railway to allow seamless movement of goods, including bulk mineral and bulk liquid trades. Integration of port facilities with the railway supports the Territory Government's vision of establishing Darwin as a regional transport and logistics centre and an integral part of the AustralAsia trade route.

Darwin Port is well equipped to handle container and general cargo, bulk minerals, bulk liquids including petroleum, and live cattle. The Darwin Port Corporation also operates facilities for non-trading vessels. These include offshore oil and gas rig service vessels, and cruise, naval, fishing and pearling vessels. The port plays a significant role as a supply, service and distribution base supporting research and exploration of the oil and gas resources in the nearby Timor Sea. This area of activity is a key focus for the Northern Territory complements the delivery of similar services to the growing minerals sector.

Total trade across the Port of Darwin's wharf facilities for 2006-07 increased by 384 000 tonnes or 35.6 per cent on 2005-06 total tonnage. LNG production in the region is responsible for 3.5 million tonnes of export trade annually. There were 52 LNG carrier calls completed during 2006-07 at the Port of Darwin's LNG facility, making it Australia's second largest LNG hub.

A growing number of mining projects are benefiting from the installation of a \$24 million bulk materials export facility at East Arm Wharf. Currently, iron ore and manganese are exported at the combined rate of about 1.5Mtpa. The current facilities have capacity for up to 2.5 Mtpa. Beyond that, major investment is required for an additional rail unloading facility, stockpile expansion, conveyors and a shiploader.

Darwin has been nominated by OZ Minerals as the preferred export port for copper concentrate from its Prominent Hill mine in South Australia. Securing the Prominent Hill business was an important milestone for the Port of Darwin and it is expected that around 240,000 tonnes will pass through the port each year.

BHP Billiton's Olympic Dam operations, when the proposed expansion proceeds, could transport up to 1.6 Mtpa of copper concentrate a year to Darwin for export.

The proposed Wonarah phosphate mine will produce at an initial rate of 1 Mtpa from 2010 and at 3 Mtpa from 2011.

Petroleum products remain the dominant import cargo, accounting for 71 per cent of the port's import tonnage. Petroleum product imports increased by 4.4 per cent in 2006-07, in line with increased economic activity in the Territory. Imports of bulk sulphuric acid at the rate of about 170,000 tonnes per annum supply the mining industry.

Single user ports are also located at Nhulunbuy (Rio Tinto Alcan), Groote Eylandt (GEMCO) and Bing Bong, near Borroloola to service Macarthur River Mine, and a mineral sands loading facility at Port Melville in the Tiwi Islands. The Bing Bong facility, in particular, could be available for further development if other mines open up in the region.

Darwin Port Corporation (DPC) is seeking to expand its facilities to handle higher volumes of bulk minerals and other freight. Funding has been sought through Infrastructure Australia as well as additional Northern Territory Government funding for capital to deal with projected growth. Within this context major players such as BHP Billiton are likely to develop their own bulk loading and storage facilities. DPC is finalising a Land Use Planning Framework that will make the projected infrastructure needs to support increased minerals development clearer.

For export of copper concentrate from Olympic Dam, BHP Billiton would construct a dedicated closed system to prevent the release of dust during transportation, transfer and at the storage and handling facility at East Arm. The concentrate would be transferred from the storage facility to dedicated export vessels in enclosed conveyors and a dedicated BHP Billiton ship loader to be installed on the East Arm wharf.

## 7.4 Airports

Air transport is an important enabler of economic growth in the Northern Territory, particularly given its isolation and vast distances. Major airports capable of jet aircraft operations are Darwin, Alice Springs, Ayers Rock and

Nhulunbuy. Darwin International Airport (DIA) is an international gateway and capable of handling the largest aircraft currently in operation. DIA serves a range of full-service and low-cost domestic and international airlines, air freight operators, tourism, business and holiday traffic as well as medical and general flights to Northern Territory's remote regions. The airport is co-located with Royal Australian Air Force Base Darwin, an important strategic facility for the RAAF.

An expansion of the DIA passenger terminal and apron is planned on the back of the development of DIA as a low cost carrier hub with flights to several Australian capitals and a variety of Asian destinations. Alice Springs airport receives international charter flights from Japan on a seasonal basis.

Airport Development Group (ADG) owns and operates three airports in the Northern Territory – DIA, Alice Springs and Tennant Creek airports. In total, the on-airport and off-airport businesses employed more than 1,600 people in 2006-07.

In the 2007-08, there was a total of 1.56 million passengers, of which 173,243 were international, 1,285,135 were 'major' domestic (that is, excluding passengers from within NT), and 103,838 were regional. Average annual growth rates over the preceding decade are -0.2 per cent, 5.5 per cent and 2.4 per cent respectively.

Domestic services are operated to all Australian capital cities and some regional centers by Airnorth, Vincent Aviation, Skywest, Virgin Blue, Jetstar and Qantas. International services are operated by Qantas, Jetstar, Garuda Indonesia and Airnorth.

FIFO operations centred on Darwin include McArthur River mine and the Newmont Tanami operations. The large scale mining operations of Gove and Groote Eylandt are also dependant on air transport for movement of people and time-sensitive freight.

Air services between Darwin, Kununurra and Broome provide important transport links to the mining industry in the Kimberley.

Mining operations at Tennant Creek are hampered by the lack of regular passenger transport (RPT) services and rely on charter services.

## 7.5 Gas pipelines

Pipelines are the fastest and safest method of transporting large volumes of natural gas over long distances. In the Northern Territory, they provide a vital energy link for power generation and industry.

The Bayu-Undan field, located in the Joint Petroleum Development Area (JPDA) in the Timor Sea, approximately 500 kilometres north of Darwin and 250 kilometres south of Timor-Leste, currently produces more than 100 000 barrels of liquids per day. The gas product is sent through a 502 kilometre sub-sea pipeline to the Darwin LNG Plant where it is processed and shipped by specially built transport tankers to Japan for the Tokyo Electric and Tokyo Gas companies.

NT Gas Pty Limited, in its capacity as trustee of the Amadeus Gas Trust, operates and manages over 2,000 kilometers of high pressure natural gas pipeline and facilities in the Northern Territory, including the new pipeline linking the Blacktip gas operations to the Amadeus Basin – Darwin pipeline and the pipeline to the McArthur River mine.

Envestra Limited operates the natural gas transmission pipeline that connects the Palm Valley gas field to Alice Springs. The 200 millimeter diameter pipeline supplies gas to the Northern Territory's Power and Water Corporation for power generation in Alice Springs.

Another pipeline is being constructed to interconnect the Darwin LNG Plant and the Amadeus Basin – Darwin pipeline. This will enable back-up supplies of gas to be provided in the event of supply shortfall or interruption.

In 2005, the then Alcan Gove alumina operations ended negotiations for gas supply from the Blacktip field and wound up the joint venture that was to build the Trans Territory Pipeline to supply the refinery. The Gove power station has remained fuelled by heavy oil.

## **7.6 Electricity**

Reliability of electricity supply in the Darwin region has been the subject of public concern during the past year. While lower reliability than in southern metropolitan and regional areas is to be expected during extreme weather events, the reliability of electricity system itself appears to be a problem due to a maintenance backlog and under-investment in new or replacement assets. The NT Utilities Commissioner reported in March 2009 that remedial spending is required in the form of both catching up on a maintenance backlog and rehabilitating assets overdue for replacement or renewal.

The Northern Territory's Power and Water Corporation has implemented a five year, \$1 billion program to build, upgrade and maintain facilities. Power and Water has allocated \$825 million for capital and \$258 million for repairs and maintenance initiatives under this program across power generation, power networks, water, sewerage and business services.

## 7.7 Telecommunications

While Darwin has high capacity optic fibre cable links to the rest of Australia, the overall utility of telecommunications in the Darwin region lags many more densely populated regions in Australia. Lack of competition in backhaul capacity raises costs, similar to the experience of Tasmania and regional Western Australia. High speed broadband coverage is mostly limited to the Darwin metropolitan area, with no or patchy services in fringe lifestyle and rural areas, and remote areas, including those hosting mining operations.

## 7.8 Community infrastructure

For its size, Darwin has a good standard of community infrastructure and associated services. It offers modern, comprehensive facilities and services such as schools, VET and tertiary institutions, health care facilities, sporting and recreation facilities, and child and aged care facilities at levels that approach larger cities.

Darwin's housing prices and rental costs have continued to grow strongly during 2008 and into 2009, despite a downturn in real estate elsewhere. This is indicative of both strong demand and shortages of land and dwellings. Anecdotally, housing prices and rental costs are now at a level where they are a disincentive for people to move to and remain in Darwin. Supply of developed land is a high priority for the Northern Territory Government.

In the areas outside Darwin metropolitan area, the coverage and standard of community infrastructure is fair to poor. There has been longstanding under-investment in key community infrastructure such as schools and health facilities, as evidenced by the expenditure that is now being applied to many Indigenous communities to help close the gap on Indigenous disadvantage.

## 7.9 Infrastructure planning and issues

Several recent planning studies for the Darwin region have focussed on infrastructure include:

- Minerals Study of the Central Region of the Northern Territory (2002)
- Northern Australia Transport Infrastructure Study, Department of Business, Industry and Resources Development (2005)
- NT 10 Year Infrastructure Strategy, Department of Planning and Infrastructure (to be released 2009)
- Territory 2030 - Fresh Ideas, Real Results – a 20 year strategic plan which will set the future direction for the Territory
- 15 Year Strategic Land Use Plan for the Greater Darwin Region

- Darwin Port Corporation Land Use Planning Framework (being developed)
- Land Development Corporation Master Plan for East Arm.

Infrastructure provision and use in the Darwin region and the wider Northern Territory are hindered by factors of large distances, small population, small economic and tax base, rapid growth in resources development and population, and climatic extremes. At the same time, industry and the community need high levels of infrastructure services, in part to deal with these factors. For example, efficient transport infrastructure is needed to move material and people over long distances, but in the Northern Territory environment, construction and maintenance are expensive. As well, the relatively low throughput until recently and in the near future has meant that there have been few scale economies for ports and railways.

Relative to the infrastructure task, the Northern Territory Government has very limited resources. As a consequence, infrastructure provision often lags demand. In some cases, maintenance has also fallen behind the rate required to maintain the serviceability of infrastructure, for example on roads and electricity systems.

The Northern Territory is in the midst of high growth in industrial output, population and overall economic activity. It is facing a period of even higher growth when renewed mining investment occurs and new LNG projects are committed.

Faced with these challenges, the NT Government has made submissions to the Australian Government for additional infrastructure assistance. The NT Government is also developing a 10 year Infrastructure Strategy to guide infrastructure development and management. The strategy will cover infrastructure of all types.

## 8 Growth scenario and infrastructure

The sections that follow examine the Darwin region minerals projects and those that will utilise Darwin region that are currently in the pipeline. We then discuss their implications for existing and planned infrastructure. We have included those projects that have been reported in various ABARE and the NT Government documents and have supplemented that information through our own research and consultations with industry. Section 8.1 discusses potential growth in minerals production under what could be regarded as a scenario that broadly aligns with the Advance scenario. This discussion is summarised in Table 4. Table 5 summarises the infrastructure requirements and gaps under this growth scenario.

To the extent that some minerals projects are either delayed or do not proceed and actual growth is therefore less than that discussed below, the demands on infrastructure will be reduced, or at least delayed.

Finally, we would note that a failure to implement (or delays in implementing) some of the existing infrastructure expansion plans could lead to the anticipated growth in minerals production being constrained and actual outcomes being pushed more towards those suggested by the Holding the Line and Decline growth scenarios.

Table 4 **Summary of growth scenario to 2020 for the NT and Darwin growth region**

Mineral product	Project description
Gold	Expansion of some existing mines and several new mines (eg Cosmo Deeps, Maud Creek) post 2011
Iron ore	Increased production from existing mine (Frances Creek) and possible new mine with total production of 6Mt/tpa
Uranium	Expansion of existing Ranger mine and possible new Bigrlyi plant post 2011 Possible two or three new uranium mines in Top End and Central Australia
Manganese	Expansion of both Groote Eyelandt (to 3 Mtpa) and Bootu Creek operations (to 1Mtpa)
Base metals	Expansion of existing project (McArthur River) and opening of two new projects shipping a total of 200,000tpa by rail Prominent Hill and Olympic Dam operations shipping concentrate via rail to Darwin at total 1.9Mtpa
Other metals	Nolans rare earths project post 2011, Molyhill tungsten project post 2010. Total transport tonnage up to 700,000 tpa
LNG	New INPEX LNG plant commencing construction 2010 and operations post 2014; second DLNG train commencing construction 2012 and operations post 2015.
Phosphate	New phosphate mine at Wonarah, producing 3Mtpa that is shipped via Darwin
Petroleum	Several new oil and condensate projects (Montara/Skua, Puffin, Talbot oil fields, Crux liquids project) 2009 – 2013 Potential coal to liquids production In South Australia, with liquids shipped via Darwin

*Data source:* ABARE's list of major mineral and energy projects, October 2008; Department of Regional Development, Primary Industry, Fisheries and Resources, September 2008

Table 5 **Summary of infrastructure gaps and requirements under the growth scenario to 2020 for the Darwin region and associated supply chains**

Infrastructure class	Current and future gaps	Upgraded and additional infrastructure required
Roads	<ul style="list-style-type: none"> <li>National highways prone to flooding; and need upgrading for additional heavy traffic</li> <li>Local roads unreliable in the West Season</li> <li>Port access roads inadequate</li> </ul>	<ul style="list-style-type: none"> <li>Upgrades to Stuart Highway, Victoria Highway and Barclay Highway to and Darwin trunk roads to make them more reliable allow for increased minerals movements</li> <li>Upgrades to local roads in Darwin regions to allow for more reliable movement of people and goods</li> <li>Improved road access to remote Indigenous communities, which will improve their connectivity to mainstream community and economy</li> </ul>
Railways	<ul style="list-style-type: none"> <li>Additional loading, unloading facilities and rail capacity (including passing loops) required for minerals traffic from the NT and SA</li> </ul>	<ul style="list-style-type: none"> <li>New loading sidings and associated infrastructure to service new NT mineral developments along the Adelaide to Darwin railway and in South Australia</li> <li>Additional unloading facilities at the Port of Darwin</li> <li>Possible construction of a Wonarah to Tennant Creek rail link, with possible extension to Mt Isa</li> <li>If minerals projects in SA proceed with plans to export their production out of Darwin then this may require some additions to rail infrastructure</li> </ul>
Ports	<ul style="list-style-type: none"> <li>Port bulk handling facilities inadequate for increased volumes above 2.5 Mtpa</li> </ul>	<ul style="list-style-type: none"> <li>Upgrades to storage and ship loading facilities to allow for increased minerals volumes</li> <li>A second ship loader may be required in the longer term, particularly if minerals projects in SA proceed with plans to export their production out of Darwin or if the Wonarah – Tennant Creek rail link proceeds</li> </ul>
Airports	<ul style="list-style-type: none"> <li>Terminal and apron inadequate for increasing passenger and freight traffic</li> </ul>	<ul style="list-style-type: none"> <li>Terminal and apron upgrades will be need to handle increased passenger traffic</li> </ul>
Energy	<ul style="list-style-type: none"> <li>Electricity supply reliability in parts of Darwin is poor</li> <li>Generation, transmission and distribution capacity inadequate for growth</li> </ul>	<ul style="list-style-type: none"> <li>Remotely located companies are responsible for generation and supply of electricity to their own operations</li> <li>PWC will need to upgrade Darwin supply infrastructure to improve reliability and deal with increased demand from industrial, commercial and domestic customers (~7% annual growth)</li> <li>New gas projects will require new pipelines to be built, this may include pipelines to supply mining operations</li> </ul>
Fuel	<ul style="list-style-type: none"> <li>Additional capacity required for growth</li> </ul>	<ul style="list-style-type: none"> <li>Growing demand for fuel from mining operations will require the timely construction of new liquid fuel import and storage facilities</li> </ul>
Water and wastewater	<ul style="list-style-type: none"> <li>Water and wastewater facilities inadequate for growth</li> </ul>	<ul style="list-style-type: none"> <li>Water and sewerage upgrades required for Darwin population growth and industrial expansion</li> <li>Responsibility for water supply and wastewater management falls on the mine operator</li> </ul>
Business infrastructure	<ul style="list-style-type: none"> <li>Lack of common user facilities for large-scale fabrication, storage and supply</li> </ul>	<ul style="list-style-type: none"> <li>An upgrade to the existing common user facility for the fabrication of engineered modules, storage of semi-fabricated structures and servicing of vessels and large-scale equipment.</li> <li>Supply base for offshore oil and gas operations</li> </ul>
Community infrastructure	<ul style="list-style-type: none"> <li>Telecommunications services in rural and remote areas are poor</li> <li>Land and all classes of community infrastructure are inadequate for growth</li> </ul>	<ul style="list-style-type: none"> <li>Land for housing, schools, health care facilities, sport and recreation and child care will all need to be addressed. Doing so in the Darwin metropolitan area is likely to be easier than in remote areas</li> <li>Upgrade telecommunications services in rural and remote areas</li> </ul>

## 8.1 Growth scenario, Darwin region

The Darwin region hosts several mining operations and an LNG plant. Darwin is also an important and growing minerals logistics, service and export hub. Darwin's infrastructure serves a much larger area than the Darwin region. For example, Darwin is the import port for fuel for much of the NT minerals industry and is the export port for minerals from outside the region, including concentrate from South Australian mines in the future. Darwin is also the principal supply base for offshore oil and gas operations in the Timor Sea.

It is likely that more mines will be developed in the Darwin region, more will utilise Darwin as a supply and export hub and that Darwin will host a second LNG plant, supplied with gas from the Browse Basin, with construction commencing in 2010. The existing Darwin LNG plant is also likely to be expanded.

As outlined in section 3.1, the principal minerals currently produced in the Darwin region are gold, iron ore and base metals. Natural gas and oil reserves are contained in the Timor Sea, with gas supplied to the current Darwin LNG plant. Further petroleum developments are likely in the area.

### 8.1.1 Mineral production and export

The growth scenario described here is based on currently proposed minerals developments in the Darwin region and likely to utilise Darwin as a service and export hub. It is a scenario for mineral developments that could occur if markets remain strong, policy settings are favourable and infrastructure is available and broadly aligns with the Advance scenario. If realised, this scenario would cement Darwin's role as Australia's northern minerals and energy hub.

If infrastructure falls below requirements, then growth will fall short of potential.

The growth scenario assumes:

- expansion of mining from current mineral projects over current rates, including iron ore, manganese, base metals, gold and uranium
- commencement of new minerals developments, including base metals, uranium, rare earths, iron ore, gold and phosphate
- commencement of rare earths processing near Darwin from ores mined near Alice Springs
- commencement of phosphate production at Wonarah east of Tennant Creek
- strong growth of bulk exports through the Port of Darwin in the form of iron ore, manganese, base metal concentrates and phosphate.

Total mineral tonnages being shipped by road and rail and through the Port of Darwin could reach 10 Mtpa.

### 8.1.2 Resources services

In addition to hosting new minerals developments, the growth scenario described here would also see the Darwin region expanding its role as a major resources services centre. Mining services expansion under this scenario includes:

- development of an integrated fabrication and engineering industry capable of constructing complex medium-sized modules for resources projects
- enhancement of capabilities to supply and maintain major projects with greater reliance on local technology and labour, and less on FIFO maintenance workers
- enhancement of professional services offering in Darwin, able to offer local business, legal, accounting, engineering and environmental services to resources companies
- supply of goods and services from Darwin to other States and overseas.

### 8.1.3 Oil and gas development

Oil and gas development under the Advance scenario includes:

- offshore gas production from two facilities in the Timor Sea and offshore oil production from an additional two facilities
- an additional on-shore two-train LNG plant, with a second train at the existing DLNG plant
- pipelines feeding gas to the LNG facilities from the two Timor Sea fields, and from the Browse basin
- a domgas pipeline from the Blacktip project supplying gas to Darwin and to mines and power generation elsewhere in the NT.

### 8.1.4 Infrastructure requirements

The growth scenario in the Darwin region would require a high level of infrastructure planning and provision from government and the private sector. The infrastructure requirements set out below take into account developments in both the minerals sector and the energy sectors, as well as in services to the resources sector.

The Northern Territory Government is developing a 10 year infrastructure strategy that includes a high growth scenario for Darwin that approximates the Advance scenario. If the plan is fully implemented and updated periodically as proposed, it will provide many of the facilities required to support growth. The limited financial resources of the NT Government will limit its ability to

provide high cost infrastructure such as major port upgrades. Close involvement of the Australian Government and the private sector is required.

Under the growth scenario, the infrastructure requirements are as follows. Impediments to infrastructure provision are discussed in section 8.2.

### **Roads**

Some upgrades of the Stuart Highway and trunk roads in Darwin are required to accommodate more mineral traffic and traffic associated with gas and industrial developments. These upgrades would continue upgrades undertaken in recent years and planned.

Governments have responsibility for provisions and maintenance of public roads.

### **Railways**

The Adelaide to Darwin railway is a key facility for the transport of mineral products both from the Darwin region and from as far away as South Australia. The railway is currently operating below capacity. However, new loading sidings and associated infrastructure may be required to service mineral developments in the region. This sort of infrastructure is generally provided by the rail operator under a commercial arrangement with the mine operator.

The growth scenario will require the duplication of the current railcar unloading facility at the Port of Darwin. The Darwin Port Corporation proposes to fund and manage this.

If minerals projects in SA proceed with existing plans to export their production out of Darwin then this may require some additions to rail infrastructure. Similarly, the potential development of Mount Isa to Tennant Creek rail link may have implications for the volume of traffic on the railway into Darwin and necessitate infrastructure upgrades.

### **Ports**

The Port of Darwin is the major port in the region. Port Melville, on nearby Melville Island has exported mineral sands until recently and may do so in future when mining operations recommence.

The Port of Darwin's mineral stockpiling and reclaiming facilities and the shiploader will require major upgrades to deal with the big increase in export tonnages envisaged. Storage sheds and a possible second shiploader will be required at some point, particularly if minerals projects in SA proceed with their plans to export their production through this port.

### **Airports**

The Advance scenario will generate the need to upgrade Darwin Airport facilities to handle greater passenger numbers. NT Airports is planning for this upgrade.

### **Energy**

Each mining operation under the Advance scenario requires electricity supplies. The companies involved are responsible for generation and supply of electricity to their own operations where these are remote from networks. Where the mining and export operations are within network areas (in general close to Darwin and to the transmission line to Katherine) these operations have the option to have electricity supplied by the generator and network operator under normal commercial arrangements.

The NT Government owned utility, Power and Water Corporation (PWC), is planning for increased demand from industrial, commercial and domestic customers. However the resources industry has raised concerns about the levels of non-transparent taxation in this area.

The Blacktip gas project will result in additional gas becoming available for use by minerals operations. Mining operators would negotiate commercial arrangements for gas supply and transport with the operators of the gas field and/or Power and Water Corporation and separately the pipeline operator.

The Darwin LNG project, operated by ConocoPhillips, may provide another source of gas if it is expanded, fed by a new offshore field such as Blacktip. This gas could supply gas processing industries. Similarly, the INPEX Ichthys LNG project, if it proceeds, could provide a gas supply option.

### **Water and wastewater**

Water supply and wastewater management for mining operations is the responsibility of mine operators.

In Greater Darwin, water supply is the responsibility of the government owned utility, PWC. Increasing population will generate increased demand for these services.

### **Telecommunications**

Mining operations will require efficient telecommunications, which will need to be procured from providers by minerals companies. Household telecommunications are the responsibility of providers, with government providing CSO payment for telecommunications services in remote regions.

Telecommunications services in the inner Darwin are generally adequate, but away from the high density residential areas, access to broadband is poor, with slower and less reliable satellite broadband often the only alternative. Direct government involvement may be required to drive the level of investment required to develop fibre optic links.

### **Industry infrastructure**

A key piece of industry infrastructure identified for Darwin is a common user facility that is able to be accessed by a variety of firms for the purpose of fabrication of engineered modules, storage of semi-fabricated structures and servicing of vessels and large-scale equipment. During 2008, a pre-feasibility study was undertaken for such a facility and the Government opened a 'common-user area' with minimal facilities. A more comprehensive facility would enable Darwin industry to participate more fully in resources projects.

### **Other business infrastructure**

The economic activity generated by additional minerals and energy projects will in turn generate a need for industrial infrastructure such as serviced land that will require government and the private sector to plan and develop. The Northern Territory Government is planning for this.

### **Community infrastructure**

The principal drivers of the need for enhanced community infrastructure are increased populations in Darwin as a result of minerals and energy industry activity. The community infrastructure requirements under the growth scenario are, in summary:

- Land for housing: adequate land is required to a timeframe that meets the needs of population growth so as to avoid land shortages and consequent steep price increases
- Schools: adequate schools are a key determinant of the ability of the minerals industry to attract and retain staff, with the current school facilities being adequate but needing to be expanded and upgraded to service increased populations
- Health care facilities: the current facilities are adequate but may need to be expanded and upgraded to service increased populations and to meet contemporary health care standards (the Royal Darwin Hospital is now 30 years old)
- Sport and recreation: the current facilities are adequate but may need to be expanded and upgraded to service increased populations
- Child care: additional child care and children's services facilities will be required to meet the needs of additional families.

Addressing this infrastructure needs in the Darwin metropolitan area is likely to be easier than in remote areas. However, the ability of mining operators to attract and retain workers will depend in part upon the degree of access to these kinds of community facilities.

Remote community infrastructure requires major upgrading to provide Indigenous people with the services required to enable them to participate in the mainstream economy and improve their social situation. The NT and Australian Governments are working together in a major investment program to provide housing and other infrastructure and this will need to continue.

## 8.2 Infrastructure impediments

The principal impediments to timely infrastructure provision to support minerals growth in the Darwin Region and Northern Territory are as follows:

### Limited financial capacity

The Northern Territory Government has very limited financial capacity to fund infrastructure, including through government owned enterprises, due to:

- high rates of growth
- competing demands
- limits on borrowing, including debt to revenue ratio caps and borrowing difficulties.

Commonwealth involvement is required to supplement available funds.

### Infrastructure deficits

Investment in both new infrastructure and maintenance in the Northern Territory has fallen below requirements to sustain service levels. There is now a substantial infrastructure deficit across several infrastructure classes including roads and health facilities. Coordinated efforts and Commonwealth involvement is required to overcome deficits.

### Integrated planning

There has been a lack of integrated planning of infrastructure in the Northern Territory, which has resulted in inconsistent approaches across infrastructure classes. This has also resulted in current and potential land use conflicts, in particular between residential land and future land for industry.

There has also been a lack of coordination with the Commonwealth.

The new Northern Territory 10 Year Infrastructure Strategy will put in place a fully integrated approach to infrastructure planning and provision. The new

COAG approach should improve Commonwealth – State/Territory coordination.

### **Commercial pressures**

The voluntary administration status of FreightLink calls into question the ability of the company to invest in upgrades and expansion of rail facilities to meet minerals industry needs. Sale of FreightLink to a viable enterprise is an imperative to enable new investment.