Northern Territory Minerals Sector Economic Contribution Study 2023/24

May 2025

Prepared for Minerals Council of Australia – Northern Territory Division

Contents

Introduction

Lawrence Consulting was commissioned by the Minerals Council of Australia (MCA) – Northern Territory Division to determine the economic benefit to the Northern Territory economy based on expenditure data provided by ten (10) mineral resource companies operating in Northern Territory. This report provides a detailed summary of the level of direct expenditure into the territory economy by the minerals sector in 2023/24 and the multiplier and consumption-induced effects that are generated by that initial stimulus.

While the minerals sector makes a significant contribution to the Northern Territory and Australian economies, information about the impacts of the sector on regional and metropolitan economies within Northern Territory is limited. Impacts on regional and metropolitan areas of Northern Territory occur through direct, indirect and final consumption effects. There are two key types of direct impacts:

- Wages for direct employment of workforce; and
- Expenditure on business services in local and regional economies.

Business expenditure generates both upstream and downstream ripple effects through the business supply chain as local businesses purchase goods and services from other businesses, often through several links in the supply chain. The net effect of subsequent rounds of economic activity in the business supply chain can be categorised as indirect effects. The increased employment that is generated through the direct effects (minerals sector employment) and the indirect effects (business supply chain) generates a number of final consumption-induced effects to support the increased population base.

The focus of this report is to identify the geographical spread of impacts (direct, indirect and consumption-induced) from the minerals sector across the Northern Territory at a number of different geographic scales:

- State (the whole area of the Northern Territory);
- Regional (represented by 2 Statistical Regions in the NT);
- Local (represented by 17 Local Government Areas in the NT);
- State electoral divisions (represented by 25 SEDs in the NT); and
- Commonwealth electoral divisions (represented by 2 CEDs in the NT).

This report concentrates more on the state and regional profiles, whilst data tables for LGAs, SEDs and CEDs are contained in the Appendices.

Company Survey

The process was initiated in September 2024 when MCA distributed an expenditure survey form to Northern Territory mineral resource companies, who were asked to disclose total operational spending in 2023/24 in the following categories:

- Employee salaries and wages (by place of residence) for full-time direct employees and contract workers as well as the number of FTE employees by place of operation;
- Goods and services expenditure by individual supplier, including separate identification of both operational expenditure (opex) data for current projects and capital expenditure (capex) data from projects currently under development;
- Voluntary community contributions by individual organisation;
- Local government payments, including council rates and infrastructure charges;
- State government payments, including royalties, stamp duty, payroll tax and land tax; and
- Commonwealth government payments, including corporate income taxes and fringe benefits tax.

Ten (10) companies returned the survey, representing the majority of the Northern Territory minerals sector based on current value of production. The data was supplied by Australian postcodes where the salary was paid (residence of the direct employee) and where the community contributions and business expenditures were made.

Table 1: Northern Territory Mineral Resource Companies Supplying Expenditure Data

Core Lithium Ltd	**Rio Tinto Gove**
Energy Resources of Australia	**South32 Groote Eylandt Mining Company (GEMCO)**
Gulkala Mining Company	**Tennant Mining**
Glencore McArthur River	**Verdant Minerals**
Newmont Australia	**Vista Gold**

The postcode spend data were then aggregated using geographical concordance files from the Australian Bureau of Statistics and the economic impacts (direct, indirect and consumption impacts) of the minerals sector were analysed at five geographic levels.

Economic Benefits

Direct Impact

Direct Spending

Expenditure data provided by the resource companies surveyed indicated that the **minerals sector contributed $1.4 billion** in direct spending to the Northern Territory economy in 2023/24, comprising:

- **$256.9 million in wages and salaries** to approximately **1,468 direct fulltime resident employees**, representing an **average salary** level across the sector of **$175,018** per annum;
- **Total workforce of 6,648 full-time equivalent workers** (including 3,121 direct employees by place of operation and 3,527 contract workers);
- **$691.6 million in purchases of goods and services from almost 770 local businesses** (including contract payments);
- **$6.0 million in contributions to 117 local community organisations;**
- **$5.3 million in payments to local government** (including rates, developer contributions and other payments); and
- **$431.5 million** in state government payments (including royalties, stamp duty, payroll tax and land tax).

The minerals sector contributed ***$1.4 billion*** *in direct spending to the Northern Territory economy in 2023/24.*

The direct economic stimulus provided by the NT minerals sector in 2023/24 also extended to other states, with an additional $2.8 billion in spending, which combined with the impact in the NT for a **total direct impact of $4.2 billion for the whole of Australia**, comprised of:

- $550.3 million in wages and salaries to approximately 2,891 full-time residing employees;
- $3.0 billion in purchases of goods and services from local businesses;
- $6.7 million in community contributions; and
- $677.0 million in government payments (federal, state and local).

When overseas and other unallocated spending of $147.9 million was also included, the **total direct expenditure relating to the Northern Territory minerals sector was approximately $4.4 billion in 2023/24**.

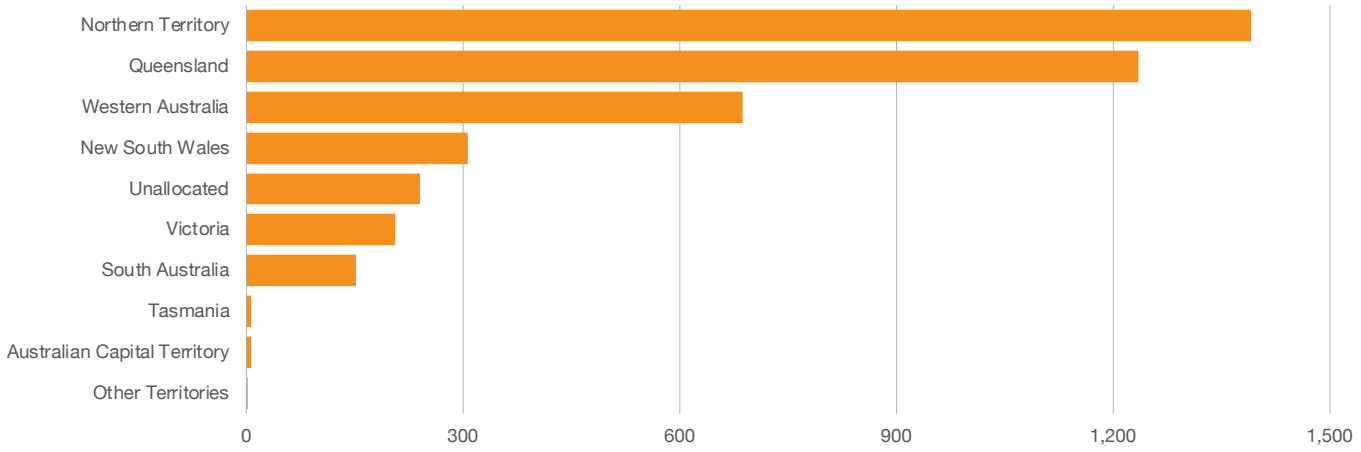
Table 2: Direct Impact of Northern Territory Minerals Sector by State, 2023/24

State	Residing employees (FTEs)	Associated salaries ($M)	Suppliers, community and local govt payments ($M)	State and federal govt payments ($M)	Total direct spending ($M)
New South Wales	65	12.6	293.5	0.0	306.1
Victoria	35	6.6	199.7	0.0	206.2
Queensland	1,052	214.7	1,020.6	0.0	1,235.3
South Australia	35	6.1	145.9	0.0	152.0
Western Australia	224	51.4	635.3	0.0	686.7
Tasmania	8	1.4	5.5	0.0	6.9
Northern Territory	**1,468**	**256.9**	**702.9**	**431.5**	**1,391.3**
Australian Capital Territory	3	0.5	6.2	0.0	6.7
Other Territories	0	0.0	0.0	0.0	0.0
Unallocated[(a)]	0	0.0	0.0	240.2	240.2
Total Australia	**2,891**	**550.3**	**3,009.6**	**671.7**	**4,231.5**
Overseas	3	0.0	63.5	0.0	63.5
Other	13	2.6	81.9	0.0	84.4
Total	**2,907**	**552.8**	**3,154.9**	**671.7**	**4,379.4**

Note: (a) Includes Federal Government payments.

NT Minerals Sector Direct Spend by State

2023/24 ($ million)



Local Suppliers

An estimated 769 unique businesses in the Northern Territory received payments for goods and services supplied during 2023/24 to those survey respondents that provided supplier details. The highest number of businesses was recorded in the Darwin region (568), followed by Northern Territory – Outback (201). Across Australia, the NT minerals sector supported 2,652 local businesses in 2023/24.

Table 3: Number of Businesses Supported by State, 2023/24

State	Number of local suppliers
New South Wales	449
Victoria	354
Queensland	799
South Australia	149
Western Australia	719
Tasmania	8
Northern Territory	**769**
Australian Capital Territory	10
Other Territories	<5
Total Australia	**2,652**
Overseas	75
Other	66
Total	**2,793**

Note: Only for those companies that provided supplier details. Duplicates were removed to the best extent practicable to ensure an accurate estimation of the number of businesses supported at both state and regional level.

Local Businesses Supported by Minerals Sector by Region
Northern Territory, 2023/24

Community Support

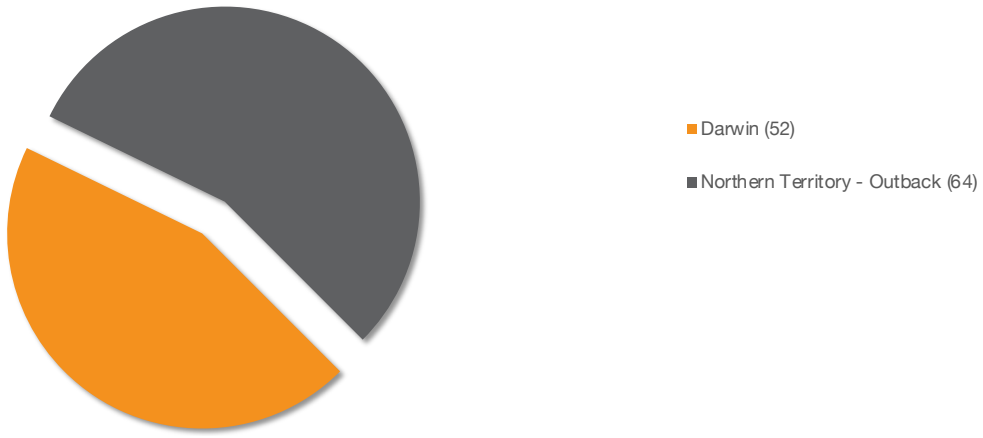
During 2023/24, minerals sector companies directly contributed almost $6.0 million to 117 separate community groups across the Northern Territory in a wide range of areas including health, education, environment and the arts. The Northern Territory – Outback region recorded the highest number of community organisations supported (64), followed by Darwin (52).

Table 4: Number of Community Organisations Supported by Region, 2023/24

Region	No. of community groups	% of total	Total contribution
Darwin	52	44.7%	$1,776,549
Northern Territory - Outback	64	55.3%	$4,192,891
Total Northern Territory	**117**	**100.0%**	**$5,969,440**
Rest of Australia	10		$714,307
Total Australia	**127**		**$6,683,747**

Note: Only for those companies that provided details. n.p. not publishable data. Duplicates were removed to the best extent practicable to ensure an accurate estimation of the number of individual community organisations supported at both state and regional level. The total number of community organisations supported for the Northern Territory is less than the aggregate for all regions due to the removal of duplicates.

Community Organisations Supported by Minerals Sector by Region
Northern Territory, 2023/24



Indirect Impact

The I-O modelling conducted for this project has estimated the indirect (Type I) and consumption-induced (Type II) effects flowing from the business expenditure, community and government contributions of $1.1 billion and the employment expenditure of $256.9 million. These impacts have been modelled separately and then aggregated to identify the level of impacts on output, incomes, employment and industry value added in the Northern Territory. In 2023/24, the $1.4 million in direct spending by the minerals sector in the Northern Territory supported additional supply chain and consumption-induced effects of 8,857 fulltime jobs and $2.5 billion in aggregate spending ($881.7 million in wages and salaries and $1.6 billion in purchases of goods and services).

In 2023/24, the Northern Territory minerals sector supported an additional **8,857 fulltime jobs and $1.6 billion in aggregate spending** *($881.7 million in wages and salaries and $1.6 billion in purchases of goods and services).*

Total Impact

The results of the I-O modelling allow estimates to be made about the total size of impacts from the minerals sector on the economy. For each key measure, the total impact on the economy is the sum of the direct effects from industry, the indirect effects through the business chain, and the final consumption-induced effects. The total economic impact (i.e. direct, indirect and induced, or Type II impact) from the minerals sector to the Northern Territory economy in 2023/24 amounted to:

- **$3.0 billion in output/turnover** (or purchases from supplying businesses);
- **$2.8 billion in gross value added** (contribution to gross state product);
- **$1.1 billion in income** (wages and salaries); and
- **10,325 full-time equivalent jobs**.

Estimates of the contribution to Gross State Product (GSP) require an estimate of the initial contribution of the industry in terms of direct value added – defined as compensation of employees plus gross operating surplus plus other taxes less subsidies on production – plus the value added effects generated through the business chain and consumption effects. A precise measure of direct value added for the minerals sector is not available from the data; an estimated value added of $1.4 billion – equivalent to the sum of input and labour costs, or total direct spending – has instead been adopted.

When business supply and employment effects are considered, the minerals sector generated approximately **$2.8 billion in gross value added** ($1.4 billion in direct effects, and $1.4 billion in supply chain and consumption effects) in 2023/24 and was responsible for supporting approximately **10,325 FTE jobs** (1,468 in direct employment and 8,857 in additional employment). This means that the minerals sector contributed an estimated **8.5% of Gross State Product** (based on the figure of $33.1 billion in 2023/24) and **7.2% of total employment** (143,512 persons) in the Northern Territory in 2023/24.

The total economic impact of the Northern Territory minerals sector was estimated at **$2.8 billion** *in gross value added and* **10,325 FTE jobs** *supported in 2023/24.*

Under the more conservative Type I scenario (i.e. excluding consumption-induced effects), direct spending by the companies surveyed and flow-on impacts contributed 6.9% to GSP and 4.5% of total state employment.

Table 5: Economic Impact of Northern Territory Minerals Sector, 2023/24			
	Northern Territory	Rest of Australia	Total Australia
Gross Value Added ($M)			
Direct	1,391	2,840	4,232
% of Gross State Product (GSP)	4.2%	0.1%	0.2%
Indirect	909	2,358	3,268
Total GVA (Type I)	2,300	5,199	7,499
% of GSP	6.9%	0.2%	0.3%
Consumption-induced	514	1,468	1,982
Total GVA (Type II)	**2,814**	**6,667**	**9,482**
% of GSP	8.5%	0.3%	0.4%
Employment (FTEs)			
Direct	1,468	1,422	2,891
% of total state employment	1.0%	0.0%	0.0%
Indirect	5,030	15,419	20,449
Total employment (Type I)	6,498	16,841	23,340
% of total state employment	4.5%	0.1%	0.2%
Consumption-induced	3,827	8,748	12,575
Total employment (Type II)	**10,325**	**25,590**	**35,915**
% of total state employment	7.2%	0.2%	0.3%
Business spend (incl. community contributions and govt payments) ($M)			
Direct	1,826	4,613	6,439
Indirect	598	2,497	3,095
Total business spend (Type I)	2,424	7,109	9,534
Consumption-induced	1,006	2,700	3,706
Total business spend (Type II)	3,430	9,810	13,240
Wages & salaries ($M)			
Direct	257	293	550
Indirect	550	1,304	1,853
Total wages & salaries (Type I)	807	1,597	2,404
Consumption-induced	332	660	992
Total wages & salaries (Type II)	1,139	2,257	3,396

Note: Consumption-induced impacts, i.e. the increase in economic activity generated to service the additional employment generated or sustained through the direct and indirect effects, are included in Type II impacts, but are excluded from Type I impacts. Total figures may not appear as the sum of individual commodities due to rounding errors.

Regional Impact

The postcode expenditure data provided by companies was aggregated using geographical concordances at the regional and local (LGA) levels. Northern Territory minerals sector expenditures, split across salary and supplier and community contribution expenditure, varied considerably across regional areas.

The level of employment, and direct expenditure on employees and business purchases in 2023/24 is summarised for the two (2) major regions in Northern Territory in Table 6. The data illustrates that the largest proportion of direct expenditure from the minerals sector in the Northern Territory in 2023/24 was in the Darwin region ($624.2 million), followed by the Northern Territory – Outback ($335.6 million) region.

***Darwin** recorded the largest share of direct expenditure by region in 2023/24 ($624.2 million), followed by the Northern Territory – Outback ($335.6 million).*

With regard to employment, the largest share of direct full-time resident employees across the Northern Territory was again recorded in the Darwin region (755 FTEs, or 51.5%), followed by the Northern Territory – Outback (713 FTEs, or 48.5%) region.

*The largest share of direct employees across the Northern Territory was recorded in the **Darwin** region (755 FTEs, or 51.5%).*

Table 6: Direct Impact of Northern Territory Minerals Sector by Region, 2023/24

Region	Residing employees (FTEs)	Associated salaries ($M)	Business purchases, community and govt payments ($M)	No. of local suppliers	Total direct spending ($M)	% of total spending, NT
Darwin	755	124.2	500.0	568	624.2	44.9%
Northern Territory - Outback	713	132.8	202.8	201	335.6	24.1%
Rest of NT[(a)]	<5	0.0	431.5	<5	431.5	31.0%
Total Northern Territory	**1,468**	**256.9**	**1,134.3**	**769**	**1,391.3**	**100.0%**

Note: (a) Includes State Government payments, which are not region specific.

The economic modelling conducted for this project has estimated the indirect and consumption-induced effects flowing from the two key direct impacts on the economy, i.e. those generated by business supply chain expenditure in each region and those generated by consumption-induced spending in each region. These impacts have been modelled separately and then aggregated to identify the level of impacts on output, incomes, employment and industry value added for each region.

Table 7: Flow-on Impacts of Minerals Sector by Region, 2023/24 (Type II)

Region	Indirect full-time employees (FTEs)	Associated salaries ($M)	Supply of goods and services ($M)	Total indirect value added ($M)
Darwin	4,199	447.8	839.2	681.1
Northern Territory - Outback	1,972	158.4	262.1	289.1
Rest of NT[(a)]	2,687	275.4	502.7	452.9
Total Northern Territory	**8,857**	**881.7**	**1,604.0**	**1,423.1**

Table 8 shows that the minerals sector has the highest overall impact in the Darwin region, with total gross value added of $1.3 billion, meaning the sector contributed 5.9% to gross regional product ($22.1 billion). The impact in Darwin was slightly higher than regional economies, namely Northern Territory – Outback ($624.7 million in value added).

*The **Darwin** region had the highest proportion of GRP contributed by the minerals sector (5.9%), followed by Northern Territory – Outback (5.7%).*

With regard to employment, the minerals sector again had the greatest impact on jobs in the Darwin region, supporting 4,954 FTEs and comprising 5.8% of the total regional workforce, followed by the Northern Territory – Outback (2,684 FTEs and 5.1%) region.

Table 8: Total Economic Impact of Minerals Sector by Region, 2023/24

Region	Total GVA ($M)	Total value added as % of GRP	Total jobs supported (FTEs)	% of regional employment
Darwin	1,305.3	5.9%	4,954	5.8%
Northern Territory - Outback	624.7	5.7%	2,684	5.1%
Total Northern Territory	**2,814.4**	**8.5%**	**10,325**	**7.2%**

Darwin

Direct Contribution

In 2023/24, the minerals sector in this region contributed:

- Total workforce of 55 FTEs whose place of work was in the region;
- $124.2 million in wages and salaries to 568 direct fulltime resident employees, with an average salary of $164,351; and
- $497.0 million in purchases of goods and services from 568 local businesses (including contractors);
- $1.8 million in voluntary contributions to 52 community organisations; and
- $1.2 million in local government payments.

Indirect Contribution

This **$624.2 million in direct spending** supported:

- $839.2 million in additional supply chain purchases and household consumption; and
- $447.8 million in wages and salaries associated with a further 4,199 FTE jobs supported in this region.

Total Contribution

The total economic contribution (direct, indirect and consumption-induced) from the minerals sector in 2023/24 amounted to:

- $1.5 billion in supplying business purchases;
- $572.0 million in total wages and salaries paid to workers;
- **$1.3 billion in gross value added**, or 5.9% of total GRP in this region ($22.1 billion); and
- **4,954 full-time equivalent jobs**, or 5.8% of the regional workforce.

Northern Territory – Outback

Direct Contribution

In 2023/24, the minerals sector in this region contributed:

- Total workforce of 6,593 FTEs whose place of work was in the region;
- $132.8 million in wages and salaries to 713 direct fulltime resident employees, with an average salary of $186,325; and
- $194.5 million in purchases of goods and services from 201 local businesses (including contractors);
- $4.2 million in voluntary contributions to 64 community organisations; and
- $4.1 million in local government payments.

Indirect Contribution

This **$335.6 million in direct spending** supported:

- $262.1 million in additional supply chain purchases and household consumption; and
- $158.4 million in wages and salaries associated with a further 1,972 FTE jobs supported in this region.

Total Contribution

The total economic contribution (direct, indirect and consumption-induced) from the minerals sector in 2023/24 amounted to:

- $597.7 million in supplying business purchases;
- $291.2 million in total wages and salaries paid to workers;
- **$624.7 million in gross value added**, or 5.7% of total GRP in this region ($11.0 billion); and
- **2,684 full-time equivalent jobs**, or 5.1% of the regional workforce.

Local Impact

Direct Spending

The spending and employment data provided by companies was aggregated using geographical concordances at the local government area (LGA) level. As expected, Northern Territory minerals sector expenditures, split across salary and supplier and voluntary community contribution expenditure, varied considerably across LGAs. The level of employment and direct expenditure on employees and business supply chain purchases is summarised for the 18 LGAs in the Northern Territory in Appendix B.

Table 9 shows the distribution of total direct spending (i.e. salaries, business purchases and community contributions) from resources companies across the Northern Territory to the top 10 LGAs by expenditure. Darwin LGA recorded the largest share of direct expenditure in 2023/24 ($442.7 million), followed by Litchfield ($101.9 million), East Arnhem ($66.5 million), Palmerston ($52.5 million) and Alice Springs ($32.4 million).

Darwin *recorded the largest share of direct expenditure by local government area in 2023/24 ($442.7 million), followed by Litchfield ($101.9 million).*

Direct resident employment and associated salary expenditures were again greatest in the Darwin LGA ($51.6 million and 340 FTEs), followed by the Palmerston ($41.7 million and 251 FTEs) and Litchfield ($30.4 million and 162 FTEs) LGAs.

NT Minerals Sector Direct Spend by LGA
2023/24 ($ million)

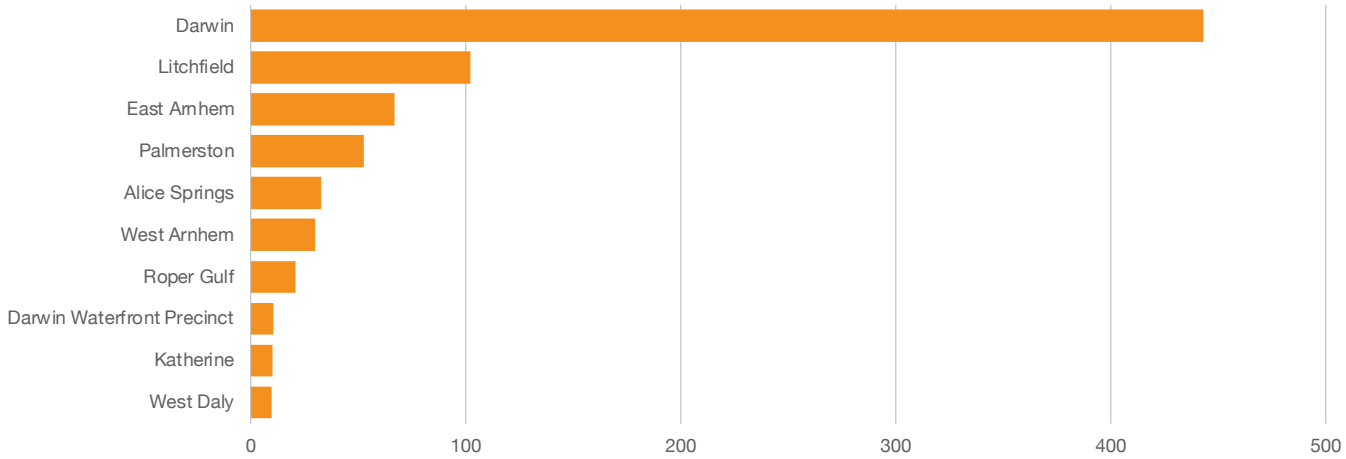


Table 9: Direct Impact of NT Minerals Sector, Highest LGAs by Expenditure, 2023/24					
LGA	Residing employees (FTEs)	Associated salaries ($M)	Business purchases, community and govt payments ($M)	Total direct spending ($M)	Local suppliers (no.)
Darwin	340	51.6	391.1	442.7	378
Litchfield	162	30.4	71.4	101.9	122
East Arnhem	145	25.8	40.7	66.5	34
Palmerston	251	41.7	10.8	52.5	45
Alice Springs	8	7.3	25.2	32.4	55
West Arnhem	63	10.0	19.9	29.9	19
Roper Gulf	43	4.0	16.5	20.5	6
Darwin Waterfront Precinct	<5	0.3	10.2	10.4	<5
Katherine	16	2.4	7.6	10.0	10
West Daly	8	1.4	8.3	9.7	<5

Indirect Impact

The I-O modelling estimated the indirect and consumption effects flowing from business supply chain expenditure and consumption spending in each LGA. These impacts have been modelled separately and then aggregated to identify the level of impacts on output, incomes, employment and industry value added for each region. The I-O model allowed for spending leakages to imports in both the first and subsequent rounds of economic activity.

Modelling consumption impacts is problematic for smaller shires with limited economic structures because only a subset of goods and services are available. Smaller and specialised mining LGAs tend to have larger expenditure leakages, typically to the nearest large regional centre. To incorporate this into the modelling, a further correction factor has been applied for LGAs, as shown in Table 10.

The total economic impact (i.e. Type II model scenario) of direct resource sector spending for each LGA across the Northern Territory in 2023/24 are contained in Appendix B, with a summary of the top 10 LGAs by value added provided in Table 11. The largest contributions made by the minerals sector to gross regional product (i.e. total estimated value added) occurred in the Darwin LGA ($1.3 billion, or 8.2% of GRP), followed by Litchfield ($221.0 million), East Arnhem ($131.0 million), Palmerston ($99.7 million) and Roper Gulf ($49.3 million).

With regard to employment, the minerals sector again had the greatest impact on jobs in the Darwin region, with 5,674 total FTEs supported, comprising 11.1% of the total workforce. Litchfield (938 FTEs, or 7.3%) and East Arnhem (601 FTEs, or 17.5%) LGAs recorded the next highest employment impacts.

Table 10: Rates of Adjustment for Local Consumption Expenditure by LGA Population Size

Population of LGA	Rate of consumption expenditure in LGA
0 – 2,000	40%
2,000 – 5,000	46.7%
5,000 – 10,000	53.3%
10,000 – 30,000	73.3%
30,000 – 50,000	80%
50,000 – 100,000	86.7%
Over 100,000	100%

Table 11: Total Economic Impact of NT Minerals Sector, Highest LGAs by Gross Value Added, 2023/24 (Type II)

Region	Total GVA ($M)	Total value added as % of GRP	Total jobs supported (FTEs)	% of regional employment
Darwin	1,257.8	8.2%	5,674	11.1%
Litchfield	221.0	7.0%	938	7.3%
East Arnhem	131.0	14.4%	601	17.5%
Palmerston	99.7	3.4%	552	2.4%
Roper Gulf	49.3	7.9%	247	9.3%
West Arnhem	42.4	8.0%	151	5.1%
Alice Springs	38.6	1.0%	50	0.2%
Darwin Waterfront Precinct	32.6	17.6%	147	65.0%
Katherine	23.7	1.6%	114	1.4%
West Daly	15.0	10.5%	46	4.3%

Conclusion

This report contains the outcomes of two key pieces of analysis. The first is the collection of primary data by the MCA Northern Territory that identifies the direct impact of mineral resource companies by local and regional areas in the Northern Territory. The second is the conduct of I-O modelling that identifies the flow-on effects through the economy at a State, Regional, Local Government Authority, State Electoral Division and Commonwealth Electoral Division level.

The results of the analysis demonstrate that incomes and expenditures from the minerals sector are widely distributed across the state generating significant flow-on effects, and that traditional economic techniques understate the true contribution of the minerals sector as they do not attribute the output from related sectors such as construction, rail transport, utilities, professional services, manufacturing and contract workers.

The analysis identifies that Northern Territory minerals sector companies contributed approximately $1.4 billion in direct spending to the territory economy in 2023/24, comprised of:

- $256.9 million in wages and salaries to approximately 1,468 direct fulltime resident employees, representing an average salary level across the sector of $175,018 per annum;
- Total workforce of 6,648 full-time equivalent workers (including 3,121 direct employees by place of operation and 3,527 contract workers);
- $691.6 million in purchases of goods and services from almost 770 local businesses (including contract payments);
- $6.0 million in contributions to 117 local community organisations;
- $5.3 million in payments to local government (including rates, developer contributions and other payments); and
- $431.5 million in state government payments (including royalties, stamp duty, payroll tax and land tax).

The minerals sector contributed ***$1.4 billion*** *in direct spending to the Northern Territory economy in 2023/24.*

The direct economic stimulus provided by the NT minerals sector in 2023/24 also extended to other states, with an additional $2.8 billion in spending, which combined with the impact in the Northern Territory for a total direct impact of $4.2 billion for the whole of Australia, comprised of:

- $550.3 million in wages and salaries to approximately 2,891 full-time residing employees;
- $3.0 billion in purchases of goods and services from local businesses;
- $6.7 million in community contributions; and
- $677.0 million in government payments (federal, state and local).

The total impact of the $1.4 billion in direct spending by the minerals sector, measured through supply chain and consumption-induced spending effects, amounted to total gross value added of $2.8 billion and total employment supported of 10,325 FTE jobs across the Northern Territory.

The total economic impact of the Northern Territory minerals sector was estimated at **$2.8 billion** *in gross value added and* **10,325 FTE jobs** *supported in 2023/24.*

Appendix A: Modelling Approach

Input-Output Modelling

For this study, input-output (I-O) modelling has been used to estimate the sum of direct, indirect and consumption-induced effects of the companies surveyed on different regions of the Northern Territory. I-O techniques provide a solid approach for taking account of the inter-relationships between the various sectors of the economy in the short-term and hence are an appropriate tool for determining the direct, indirect and induced economic impact of economic stimuli.

I-O models can be used to capture only the indirect impacts that occur through other industry sectors (Type I models), or the indirect plus the consumption-induced effects (Type II models), which have been adopted for the current study. Further, the I-O models used in this study were based on the ABS model of the Australian economy generated from general equilibrium models. Note: Type II models involve assumptions about fixed relationships between income and consumption patterns. These factors mean that the results of I-O models should generally be treated as the upper bound of estimates, and that care has to be taken in interpreting the results of very large changes in demand or production.

A concept underlying I-O modelling is that an initial economic shock or stimulus can have multiplier effects through a series of successive spending rounds. The size of the economic multiplier in a local or regional area can be summarised in the following way:

- The extent to which project operators purchase inputs from the local or regional economy. Examples of inputs include wages for labour supplied from the local or regional area, and purchases of goods and services. The more that a project operator sources from the local or regional economy, the more money that is directly injected into the economy; and
- The extent to which money spent in a local or regional economy is retained within that economy. If there is not much opportunity for people receiving income to spend it on goods and services in their local or regional area, then not as much money will be kept in the local or regional area. Larger and more diverse regional economies tend to be better at keeping expenditures in their economy and not 'losing' it to other regions.

Key advantages of using input-output models are the fineness of detail available at a disaggregated industry level, the relative ease of application, particularly for sub-regional levels, and the ability to model effects in a timely manner.

To generate predictions, the economic contribution of an industry is applied to the relevant industry sectors of the input-output model of a regional economy. The stimulus from economic activity can be traced through the economy in several different ways:

- The first-round effect, or direct effect, are those from the activities expenditure in purchasing goods from other industries;
- The second-round effects are those from the supplying industries increasing their purchases to meet the additional demand. The second and subsequent rounds of purchasing are termed the indirect effects; and
- The consumption-induced effects, which recognise that the level of local production is important in determining regional levels of household consumption, that this in turn will be spent locally to a large extent and therefore influence the level of regional consumption and the level of output of each sector.

These effects can be represented in terms of multipliers and changes in four key variables:

Output

The output impact measures the increase in gross sales throughout the whole economy by summing all the individual transactions resulting, directly and indirectly, from the economic stimulus.

Income

The income impact measures the additional amount of wages and salaries paid to employees of the industry under consideration and to other industries benefiting from the stimulus to the economy.

Employment

The employment impact measures the combined number of existing jobs sustained and new jobs generated by the stimulus, both directly and indirectly, although allocation between these forms of employment is not separately identified.

Value Added

The value added or Gross Regional Product (GRP) impact measures only the net activity at each stage of production. GRP is defined as the addition of consumption, investment and government expenditure, plus exports of goods and services, minus imports of goods and services for a region. The GRP impacts are the preferred measure for the assessment and contribution of a stimulus to the economy.

Key advantages of using input-output models are the fineness of detail available at a disaggregated industry level, the relative ease of application, particularly for sub-regional levels, and the ability to model effects in a timely manner. However, care has to be taken in its application and interpretation of results. Key assumptions that underpin the application of I-O models are:

- The inputs purchased by each industry are a function of the level of output of that industry. The input function is generally assumed linear and homogenous of degree one (which implies constant returns to scale and no substitution between inputs);
- Each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies that there is only one method used to produce each commodity and that each sector has only a single primary output;
- The total effect of carrying on several types of production is the sum of the separate effects. This rules out external economies and diseconomies and is known simply as the additivity assumption;
- The system is in equilibrium at given prices. This would not be the case in an economic system subject to external influences;
- In the static input-output model, there are no capacity constraints so that the supply of each good is perfectly elastic. Each industry can supply whatever quantity is demanded of it and there are no capital restrictions. This assumption would come into play depending upon the magnitude of the changes in quantities demanded, brought about through changes in taxation levels; and
- The input-output model is an optimisation model that allocates resources between sectors to their most efficient use.

Type II models involve additional assumptions about fixed relationships between income and consumption patterns. These factors mean that the results of I-O models should generally be treated as the upper bound of estimates, and that care has to be taken in interpreting the results of very large changes in demand or production.

Construction of Regional I-O Models

For the derivation of the regional I-O tables, a variable interference non-survey technique was applied, involving a formalised non-survey method compilation. This allowed data on direct effects of the companies surveyed to be inserted at any stage of the compilation procedure. This approach is based primarily on the Generation of Regional Input-Output Tables (GRIT) technique, a widely used method of constructing local and regional input-output tables in Australia, America and Europe. The procedure utilises cross-industry location quotients as well as superior data (including expenditure patterns of within the primary company data) for the regionalisation of the national direct requirements matrix (DRM) or at the elements of other final payments and demand, which are at the core of any I-O table.

In summary, the construction of the local and regional I-O models employed the following steps:

- Adjustment to the latest available national I-O table;
- Computation of the regional direct requirement matrix;
- Aggregation of regional sectors (if necessary); and
- Computation of the complete regional I-O table.

All the necessary data for the regionalisation procedure were collected from the Australian Bureau of Statistics as well as other reliable sources for secondary data such as regional household expenditure patterns, income and productivity measures. The latest available national I-O tables were 2021-22, which consisted of 114 sectors of economic activity, at the 4-digit level, compiled following the industry-technology assumption, product-by-product, with total flows and valued at basic values in current prices.

For estimating the regional I-O tables, and especially in the interpretation of results, relevant limitations of the I-O approach (static, linear production function, no substitution or scale economy effects, infinite elasticity of supply) were taken into consideration. Once the I-O models were generated, predictions of impact were estimated for each regional area using the available data on salary and business expenditure.

The predictions of the I-O models for regional area were estimated in two separate groups. The first group involved the economic impacts of expenditure on business goods and services (business suppliers), while the second involved economic expenditure of the labour force. Each stimulus group was modelled using expenditure coefficients and household consumption patterns applicable for each region, also taking into account the type of commodity (e.g. coal, gas, metals, etc.) and the nature of the expenditure (i.e. operating or capital expenditure).

The outputs of the models can be classified into First Round and Indirect Effects, representing industry impacts through the business chain, and Final Consumption-Induced effects, which represent the economic activity needed to support the increased workforce from Direct, First Round and Indirect Effects.

The data collection and the methodology applied in this study are notable in three key aspects:

- First, the data collected on actual spending by the minerals sector allowed an assessment of impacts by spending in the economy in comparison to the more traditional approach of predicting economic impacts from total revenue changes;
- Second, the collection of primary data by local area allowed a much more accurate assessment of the direct impacts by geographic area than had previously been available; and
- Third, the application of the I-O modelling framework down to the LGA, SED and CED levels, when combined with the accuracy of the primary data, meant that relatively accurate models of local impacts from the Northern Territory minerals sector could be generated.

The outcomes of the data collection and modelling approach meant that the assessment of direct, indirect and consumption effects could be expected to be more detailed and accurate at the LGA, SED and CED levels than could be achieved with standard applications of general equilibrium models.

Appendix B: Impact by Local Government Area

Table B1: Estimated Total Impacts of Northern Territory Minerals Sector by LGA, 2023/24

Local government area	Residing employees (FTEs)	Associated salaries ($M)	Local suppliers (no.)	Total direct spending ($M)	Total value added ($M)	Total employment (FTEs)
Alice Springs	8	7.3	55	32.4	38.6	50
Barkly	10	0.9	<5	3.8	10.0	55
Belyuen	<5	n.p.	<5	0.5	0.7	<5
Central Desert	<5	0.2	<5	0.2	0.3	<5
Coomalie	13	2.1	<5	3.7	5.2	23
Darwin	340	51.6	378	442.7	1,257.8	5,674
Darwin Waterfront	<5	0.3	<5	10.4	32.6	147
East Arnhem	145	25.8	34	66.5	131.0	601
Katherine	16	2.4	10	10.0	23.7	114
Litchfield	162	30.4	122	101.9	221.0	938
MacDonnell	<5	0.2	<5	0.2	0.3	<5
Palmerston	251	41.7	45	52.5	99.7	552
Roper Gulf	43	4.0	6	20.5	49.3	247
Tiwi Islands	6	1.1	<5	7.7	11.9	36
Victoria Daly	7	0.9	<5	2.2	3.3	14
Wagait	<5	0.2	<5	1.4	2.1	6
West Arnhem	63	10.0	19	29.9	42.4	151
West Daly	8	1.4	<5	9.7	15.0	46

Appendix C: Impact by State Electoral Division

Table C1: Estimated Total Impacts of Northern Territory Minerals Sector by SED, 2023/24

State Electoral Division	Residing employees (FTEs)	Associated salaries ($M)	Local suppliers (no.)	Total direct spending ($M)	Total value added ($M)	Total employment (FTEs)
Arafura	69	11.1	21	37.6	70.9	323
Araluen	<5	3.5	27	15.9	31.9	131
Arnhem	200	41.9	26	86.1	147.6	597
Barkly	49	4.1	6	21.5	38.2	149
Blain	56	9.1	13	11.9	19.4	103
Braitling	<5	3.1	23	13.9	27.5	112
Brennan	67	11.8	<5	11.9	17.6	103
Casuarina	34	5.2	12	7.2	12.8	70
Daly	60	10.3	13	31.1	59.0	270
Drysdale	56	9.1	13	11.8	19.2	102
Fannie Bay	39	5.9	90	49.1	100.9	362
Fong Lim	37	5.5	119	74.5	155.7	544
Goyder	69	13.0	24	30.0	53.2	227
Gwoja	<5	0.5	<5	0.6	0.9	<5
Johnston	29	4.5	10	6.2	10.3	55
Karama	39	5.8	34	29.6	59.5	227
Katherine	16	2.4	10	10.0	17.9	67
Mulka	331	58.6	75	124.7	214.7	913
Namatjira	<5	0.8	5	2.8	5.5	22
Nelson	77	14.6	66	41.1	81.0	332
Nightcliff	32	4.9	11	6.8	11.2	60
Port Darwin	61	9.3	108	281.0	590.7	1,917
Sanderson	39	5.8	41	34.9	70.8	265
Spillett	65	10.8	12	13.3	23.0	127
Wanguri	35	5.3	7	6.2	10.7	63

Appendix D: Impact by Commonwealth Electoral Division

Table D1: Estimated Total Impacts of Northern Territory Minerals Sector by CED, 2023/24

Commonwealth Electoral Division	Residing employees (FTEs)	Associated salaries ($M)	Local suppliers (no.)	Total direct spending ($M)	Total value added ($M)	Total employment (FTEs)
Lingiari	933	173.1	328	448.2	828.7	3,534
Solomon	535	83.8	441	511.6	1,061.6	3,899

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