



**ENERGY AND MINING SATELLITE
ACCOUNT ECONOMIC INDICATORS
2020/21**

**A Report for Department for Energy
and Mining**

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Prepared by

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ABBREVIATIONS

| | |
|--------|--|
| ABS | Australian Bureau of Statistics |
| AER | Australian Energy Regulator |
| AGN | Australian Gas Networks |
| AEMO | Australian Energy Market Operator |
| ANZSIC | Australia and New Zealand Standard Industrial Classification |
| ATO | Australian Tax Office |
| BLADE | Business Longitudinal Analysis Data Environment |
| CER | Clean Energy Regulator |
| DEM | Department for Energy and Mining |
| DFAT | Department of Foreign Affairs and Trade |
| FTE | full time equivalent |
| GOS | gross operating surplus |
| GSP | gross state product |
| GVA | gross value added |
| GVP | gross value of production |
| GWh | gigawatt hour |
| I-O | input-output |
| METS | Mining Equipment, Technology and Services |
| MWh | megawatt hours |
| Qtr | quarter |
| RISE | Regional Industry Structure and Employment (model) |
| SA | South Australia |
| SA2 | statistical area level 2 |
| SAPN | SA Power Networks |

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EXECUTIVE SUMMARY

Why we need Energy and Mining economic data

Government and the Energy and Mining sector are identifying local and international opportunities, accessing domestic and international markets and securing capital to accelerate business growth and employment across South Australia (SA). If Government and industry are going to invest in these opportunities, it is important to be able to measure and monitor performance of the sector over time in terms of jobs generated and income created.

For example, the South Australian Government is investing more than half a billion dollars to accelerate new hydrogen projects, shipping infrastructure and modelling tools for investors and developers. The inclusion of hydrogen in the Energy and Mining satellite accounts should be assessed, given the significance of this emerging sector.

The satellite account in this report provides a detailed picture of the many components of Energy and Mining and highlights significant contributors to the sector. The scope of the satellite accounts includes investment activity of Energy and Mining businesses. This captures activities such as construction of facilities, manufacture of plant and equipment, engineering and research. The economic indicators in this report are intended to provide a benchmark of the sector.

The economic contribution of Energy and Mining

Energy and Mining sector household income, gross operating surplus (GOS), contribution to gross state product (GSP) and employment (number of jobs and FTEs) for SA are summarised in Table ES-1. The indicators are of direct economic activity only, they exclude indirect (or flow-on) effects. In 2020/21 the Energy and Mining sector contributed almost \$10.2b to SA GSP (8.7 per cent of the state total). The largest contributors to GSP, by component of Energy and Mining, were Resources (\$4.2b), Mining Equipment, Technology and Services (METS) (\$2.5b) and Energy (\$1.6b).

Energy and Mining sector employment (FTE) in 2020/21 was approximately 51,800 jobs in SA, 5.8 per cent of the state total. Of this the largest employing components were METS (19,200 FTE), Resources (13,100 FTE) and Investment Activity (8,400 FTE).

Household income, which is associated with both employment and contribution to GSP, provides a measure of the standard of living of those who are employed in the sector. In 2020/21 about \$4.7 billion was earned by those employed in Energy and Mining (7.0 per cent of the state total). The largest earning components were METS (\$1.5b), Resources (\$1.3b) and Investment Activity (\$0.7b), in line with employment.

Table ES-1 Summary Energy and Mining satellite account, 2020/21

| | GVP ^a | Household income | Contribution to GOS | Contribution to GSP | Employment | Employment |
|----------------------------|------------------|------------------|---------------------|---------------------|---------------|---------------|
| | (\$m) | (\$m) | (\$m) | (\$m) | (Jobs) | (FTE) |
| Resources | 8,820 | 1,290 | 2,856 | 4,175 | 10,522 | 13,131 |
| Energy | 2,444 | 617 | 1,010 | 1,647 | 3,829 | 4,315 |
| Manufacturing ^b | 3,418 | 587 | 152 | 760 | 5,710 | 6,783 |
| METS ^c | 5,383 | 1,548 | 919 | 2,503 | 17,798 | 19,209 |
| Investment Activity | 4,180 | 696 | 436 | 1,144 | 7,402 | 8,359 |
| Total^d | | 4,737 | 5,373 | 10,230 | 45,261 | 51,797 |
| South Australia | | 67,496 | 41,096 | 117,506 | 937,879 | 895,760 |
| Total as % of SA | | 7.0% | 13.1% | 8.7% | 4.8% | 5.8% |

^a Gross value of production (GVP) is a measure of gross revenue produced (e.g. value of minerals mined or electricity generated). GVP can include elements of double counting. To minimise the effect of double counting, total GVP is not reported.

^b Includes non-metallic minerals & basic metals.

^c Mining Equipment, Technology and Services (METS) includes sectors at the four digit ANZSIC level that are likely to be wholly or largely servicing the minerals and energy industry e.g. mining and construction machinery manufacturing, site preparation services, engineering design and consulting services, scientific testing and analysis services, and other mining support services.

^d Totals may not sum due to rounding.

Source: BDO EconSearch analysis

1. INTRODUCTION

1.1. Purpose of the Study

Government and the Energy and Mining sector are identifying local and international opportunities, accessing domestic and international markets and securing capital to accelerate business growth and employment across South Australia. If Government and industry are going to invest in these opportunities, it is important to be able to measure and monitor performance of the sector over time in terms of jobs generated and income created.

For example, the South Australian Government is investing more than half a billion dollars to accelerate new hydrogen projects, shipping infrastructure and modelling tools for investors and developers (DEM 2022). The inclusion of hydrogen in the Energy and Mining in the satellite accounts should be assessed, given the significance of this emerging sector.

The estimation of economic data describing the Energy and Mining sector involved preparation of satellite accounts which allow an expansion of the information provided in the RISE (Regional Industry Structure and Employment) input-output (I-O) table of South Australia. The Energy and Mining satellite account was developed to describe the sector within the state I-O framework.

While all the products and services produced and consumed in the activities of the Energy and Mining sector are embedded in the I-O table, they are not readily apparent because the sector is not identified as a single industry or product in statistical standards (such as ANZSIC). In standard I-O tables, industries are defined on the basis of the goods and services which they mainly produce. On the other hand, the Energy and Mining sector is defined according to some defined production (minerals and energy) as well as the consumption of services products (including capital items), both domestically and in export markets.

The satellite accounts approach provides a means by which the economic aspects of the Energy and Mining sector can be drawn out and analysed separately using the structure of the I-O tables. In this way the Energy and Mining sector's contribution to economic activity, gross state product and employment, were estimated.

The satellite account in this report presents economic indicators by the individual components of Energy and Mining, in addition to the sector as whole. This approach provides a detailed picture of Energy and Mining and highlights significant contributors to the sector. The components of Energy and Mining are discussed in detail in Section 2.2. The economic indicators for Energy and Mining relate to direct activity of each component (e.g. mining employment, household income earned in metal smelting operations, etc.)¹.

Energy costs were also extracted from SA RISE I-O model transactions data to highlight the relative scale of energy consumption by different industries in SA (Section 3.2).

¹ The economic indicator values reported in this paper exclude flow-on (or in-direct) economic activity.

1.2. Outline of this Report

This report includes:

- a. Statement of purpose of study (Section 1.1)
- b. Description of indicators and components of Energy and Mining (Sections 2.1 and 2.2 respectively)
- c. Outline of the approach used to construct economic models and to estimate the components of Energy and Mining (Sections 2.3 and 2.4 respectively)
- d. Presentation of results (Section 3)
- e. Summary of findings and remarks relating to the future estimation of Energy and Mining satellite accounts (Section 4.1 and 4.2 respectively)

2. Method of Analysis and Data

2.1. Economic Indicators

The primary focus in this report is on economic activity associated with the Energy and Mining sector. The key economic activity indicators considered in this analysis are gross value of production, employment and contribution to gross state product (GSP).

Gross value of production (GVP) is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. value of minerals mined, electricity generated, metals smelted, etc.). GVP needs to be used with care as it includes elements of double counting (e.g. the value of basic manufactured steel includes the gross value of inputs including iron ore which was processed). To minimise the effect of double counting, total GVP is not reported.

Employment units: Employment numbers are usually reported in either full time equivalent (FTE) units, or job units defined as follows:

- **FTE:** is a way to measure a worker's involvement in a project. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time. Typically, different scales are used to calibrate this number, depending on the type of industry and scope of the analysis, but the basic calculation is the total hours worked divided by average annual hours worked in full-time jobs. The reported indicators are calculated on the basis that 1.0 FTE is equal to 37.5 hours worked per week.
- **Jobs:** is used to refer to the number of workers employed, regardless of the number of hours worked.

This report presents employment in terms of both number of jobs and FTE units.

Contribution to GSP: is a measure of the contribution of an activity to the state economy. GSP is measured as value of gross output (business revenue) less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of:

- **household income** - compensation of employees (wages and salaries) plus payments to owner managers
- **gross operating surplus (GOS)** - this is calculated net of payments to owner managers
- **taxes less subsidies (TLS)** - taxes less subsidies on products and taxes less subsidies on production.

Contribution to GSP of an industry represents payments by that industry to the primary inputs of production (labour, capital and land). Using GSP as a measure of economic activity avoids the problem of double counting that may arise from using GVP for this purpose.

This report presents estimates of contribution to GSP, household income and GOS. TLS can be deduced by calculating the residual of GSP less household income and GOS.

2.2. Components of Energy and Mining

The satellite account provides economic indicators for the Energy and Mining sector by individual components. The Energy and Mining sector was defined in consultation with the Department for Energy and Mining (DEM) to include the following components.

Resources

Relates to mining activities, and consists of the Coal, Oil & Gas Extraction, Iron & Non Ferrous Metal Mining, Non Metal Mining and Exploration sectors (Appendix 1). Some of the economic contribution from these sectors was considered to be Mining Equipment, Technology and Services (METS) sector related. The economic contribution of METS activities by the Resources sector was excluded from this part of the satellite account to avoid double counting.

Energy

The energy component relates to energy generation and supply. This consists of the Electricity Generation, Electricity Distribution and Gas Supply sectors (Appendix 1). Some of the economic contribution from these sectors was also considered to be METS related, and was excluded from this part of the satellite account to avoid double counting.

Manufacturing (non-metallic minerals & basic metals)

Non-metallic minerals manufacturing and basic metals production, being a significant downstream component of the SA mining industry, was also included in the satellite account. Non-metallic minerals consists of glass product, ceramic product, cement, lime & ready-mixed concrete, plaster & concrete product, and other non-metallic mineral product manufacturing (Appendix 1). Basic metals consists of the Iron & steel manufacturing and Non Ferrous metals manufacturing sectors (Appendix 1). Some of the economic contribution from these sectors was considered to be METS related, and was excluded from this part of the satellite account to avoid double counting.

Mining Equipment, Technology and Services

Mining Equipment, Technology and Services involves economic activity which is generated to meet the demands of the energy and resources sector. Note this only relates to operating activities (i.e. excludes resource sector investment) and consist of all industries across the SA economy.

Investment activity

Investment by the direct components of Energy and Mining (i.e. resources, energy and manufacturing) also contributes significant economic activity. Similar to METS, this represents economic activity generated to meet the demand for capital investment by the resources, energy and manufacturing components. This captures activities such as construction of facilities, manufacture of plant and equipment, engineering and research.

A proportion of the capital investment was modelled to be provided by the resources and energy components themselves. Investment activity carried out by resources and energy components was already accounted for (in the direct components to Energy and Mining) and was excluded from capital formation to avoid double counting.

2.3. Constructing Economic Models with the METS Sector

While all the products produced and consumed in meeting the demand of the minerals and energy sector are embedded in the SA RISE I-O table, they are not readily apparent because METS is not identified as an industry or product in statistical standards. In the Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 edition, underlying the SA I-O table, industries are defined on the basis of the goods and services which they mainly produce. On the other hand, the METS industry is defined according to the status of the consumption by the minerals and energy sector, both domestically and in export markets. That is, it is the characteristics of the consuming industries that determine whether the production is included within the scope of METS.

The preparation of the METS sector economic information included the following broad steps:

1. Compiled detailed transactions data from SA RISE I-O tables for each of the mineral and energy sectors on an industry by industry basis (SA 78 sector level).
2. Identified those sectors at the four digit ANZSIC level that are likely to be wholly or largely servicing the minerals and energy industry (i.e. specialist Mining Equipment, Technology and Services industries). These include, for example:
 - a. 1090 Other Mining Support Services
 - b. 2462 Mining & Construction Machinery manufacturing
 - c. 3212 Site Preparation Services
 - d. 6922 Surveying & Mapping Services
 - e. 6923 Engineering Design & Consulting Services
 - f. 6925 Scientific Testing & Analysis Services
3. Matched 4-digit ANZSIC industries identified in (Step 2) to the SA RISE 78 sector industry classification.
4. For each of the matched industries, investigated the range of products produced by these industries through reference to the Input-Output Product Classification (this is an ABS publication 5215.0.55.001 - Australian National Accounts: Input-Output Tables -Product Details (ABS 2022a))
5. Steps (3) and (4) enabled compilation of a set of products and services likely to be produced by specialist Mining Equipment, Technology and Services industries.
6. The data from step (5), together with the input-output transactions tables' data compiled in step (1), were then used to construct a RISE model with the addition of the METS sector (referred as the 79 sector RISE model).

2.4. Satellite Account Calculation Method and Data Sources

This section provides a brief overview of how each component of Energy and Mining was sourced and estimated.

Resources (mining including oil & gas extraction)

- All indicators (GVP, Household income, GSP and employment) were sourced from the 79 sector SA RISE model² economic profile data.
- The I-O models have been constructed to be consistent with DEM mineral production data (i.e. GVP for mineral producing sectors sum to production values).
- In order to reflect the resource sector more closely, Compensation of employees (COE) data used in the I-O models, were taken from Australian Industry data (ABS 2021a).
 - The difference between the Australian industry data and State accounts was balanced out by adjusting the Wholesale Trade and Administration COE.
 - Adjustments to Wholesale Trade and Administration were necessary in order keep the I-O model consistent with GSP data published in the state accounts.
- “Other mining support services”, a component of “Exploration and Mining Support Services”, is considered a METS activity and was excluded from Resources. It was reported as part of the METS economic indicators in order to avoid double counting.

Energy (electricity distribution & generation and gas supply)

- All indicators (GVP, household income, GSP and employment) were sourced from the 79 sector SA RISE model economic profile data.
- The I-O models have been constructed to be consistent with financial reporting to the Australian Energy Regulator (AER) and electricity generation information published by the Australian Energy Market Operator (AEMO).
 - GVP for electricity distribution was calculated as ‘Total revenue’ *less* ‘Contributions’ from ‘Audited Statutory Accounts’ (SAPN 2021) *plus* ‘Network charges’ from ‘Disaggregation Statements’ (ElectraNet 2021).
 - GVP for electricity generation was calculated as the total supply of SA electricity (13,973 GWh in 2020/21) multiplied by the average price (volume weighted) for SA electricity (\$44.78 per MWh in 2020/21) in the ‘South Australian Electricity Report’ (AEMO 2021).
- The Energy sector may also function partly in the METS sector. Such activities are included as part of METS economic indicators (below).

Manufacturing (non-metallic minerals and basic metals)

- All indicators (GVP, Household income, GSP and employment) were sourced from the 79 sector SA RISE model economic profile data.
- Non-metallic minerals manufacturing consists of

² See section 2.3 for additional information regarding the 79 sector model.

- Glass and glass product manufacturing
- Ceramic product manufacturing
- Cement, lime & ready-mixed concrete manufacturing
- Plaster & concrete product manufacturing
- Other non-metallic mineral product manufacturing
- Basic metals manufacturing consists of
 - Iron & steel manufacturing
 - Non Ferrous metals manufacturing
- The Non-metallic Minerals and Basic Metals Manufacturing sectors may also function partly in the METS sector. Such activities are included as METS economic indicators (discussed below).
- Additional data and methods have been used to estimate the *Iron and Steel* and *Non Ferrous Metals* manufacturing sectors. These being:
 - GVP: Based on *Primary metal and metal product manufacturing* from ABS *Australian Industry* (ABS 2022b) for SA, which was allocated proportionally to Basic Ferrous Metal Manufacturing³ and Basic Non-Ferrous Metal Manufacturing⁴ production figures for 2020/21.
 - COE was estimated using wage rates from ABS *Australian industry* (ABS 2022b).
 - TLS were estimated from the latest national I-O table (ABS 2022c). TLS were proportional to production for the *Iron and Steel Manufacturing* and *Basic Non-Ferrous Metal Manufacturing* I-O sectors combined.
 - Intermediate expenditure and imports were estimated similar to TLS
 - GOS was estimated as the residual of GVP less COE, TLS, Intermediate expenditure and imports.

Mining Equipment, Technology and Services

- All indicators (GVP, Household income, GSP and employment) were sourced from the 79 sector SA RISE model economic profile data.
- The 79 sector model was built specifically for this project, and includes the Mining Equipment, Technology and Services (METS) sector (see Section 2.3 for additional detail).
- The METS sector involves economic activity across all 78 other sectors (to various degrees). Adjustments⁵ have been made across all I-O sectors to avoid double counting economic activity.

³ Sourced from revenue data of key businesses: DEM, pers. comm., (15/09/22).

⁴ The value of production was assumed to be equal to South Australian lead exports in 2020/21 DFAT (2022).

⁵ Based on ANZSIC codes wholly identified as METS and 78 sector I-O transactions data

Investment Activity

Resources

- Total mining CAPEX of \$2,076.0m in 2020/21, was calculated as the 4Qtr (quarter) total, taken from ABS Private New Capital Expenditure and Expected Expenditure (ABS 2022d).
- The total CAPEX was allocated to I-O sectors based on a hypothetical mine establishment cost structure (Table 2-1).
- Economic indicators are estimated as the direct effect of a CAPEX (final demand) shock, as generated by the 79 sector RISE model.
- Economic indicators (Household income, GSP and Employment) for CAPEX spent within the Resources sector are excluded from the estimation process. These activities are accounted for under the Resources sector direct contribution described above.

Table 2-1 Hypothetical mining CAPEX I-O allocations

| Asset class | I-O sector allocation (% of asset class) | % of total CAPEX costs |
|---------------------------------------|---|---------------------------|
| Processing plant | Other Construction (90%), ProSciTech (10%) | 45.0% |
| Accessibility (road, airstrips, etc.) | Other Construction (90%), ProSciTech (10%) | 12.5% |
| Accommodation village | Residential Construction (100%) | 4.5% |
| Communications | Communication Services (100%) | 1.5% |
| Power | Power Supply (100%) | 1.5% |
| Ancillary services and cleaning | Construction Services (100%) | 0.5% |
| Geotechnical services (construction) | Resources (100%) | 0.5% |
| Mine development | Resources (100%) | 20.0% |
| Vehicles and parts | Imports (100%) | 1.5% |
| Other owners costs | Resources (100%) | 12.5% |
| Total | | 100.0% |

Source: BDO EconSearch analysis

Energy

- Total capital formation data for *Electricity, Gas, Water and Waste Services* (ANZSIC division D) are available in the ABS State Accounts (ABS 2021), Table 24 (\$2,030.0m in 2020/21).
- The private sector Energy component of *Electricity, Gas, Water and Waste Services* capital formation was estimated using ABS engineering work done data (ABS 2022e), Table 22. This was estimated in proportion to:
 - Private investment in “Electricity generation, transmission etc. and pipelines” - \$1,075.6m in 2020/21
 - Private and Public investment in “Electricity generation, transmission etc. and pipelines” and “Water storage and supply, sewerage and drainage” - \$1,844.3 in 2020/21.

- Based on the above, energy was estimated to be approximately 58% of total capital formation for ANZSIC division D (\$1,183.9m).
- The Electricity Generation and Distribution component of total CAPEX was then sourced from ABS Value of Renewable Energy Construction (ABS 2022f). Electricity Generation and Distribution CAPEX was the combined 4Qtr sum of value of work done in SA for renewable and other electricity investment (\$1,038.8m in 2020/21).
- The Gas component of total CAPEX (\$145.1m) was then calculated as the residual of total CAPEX (\$1,183.9m) less Electricity Generation and Distribution CAPEX (\$1,038.8m).
- Of the Electricity Generation and Distribution component of total CAPEX (\$1,038.8m), \$452.0m was conservatively assumed to be spent within the sector. Similarly of the Gas Supply component of total CAPEX (\$145.1m), \$1.8m was assumed to be spent within the sector. These assumptions are based on the 79 sector RISE model where \$452.0m is the combined capital formation for Electricity Generation and Electricity Distribution sectors, and \$1.8m is capital formation for the Gas Supply sector.
- The remaining CAPEX (\$586.8m for Electricity Generation and Distribution and \$143.3 for Gas Supply in 2020/21) was proportionally allocated to organisations for which CAPEX data were available (SAPN, ElectraNet and AGN)⁶.
- This allowed splitting total CAPEX (for each organisation) into asset classes, which were allocated to appropriate I-O sectors (Table 2-2, Table 2-3 and Table 2-4).
 - ElectraNet and SAPN data were sourced from statutory reporting to the Australian Energy Regulator
 - AGN: Asset classes were based proportionally on AGN's *Mount Barker Natural Gas Extension Business Case*.
- Economic indicators are estimated as the direct effect of a CAPEX (final demand) shock, as generated by the 79 sector RISE model.
- Economic indicators (household income, GSP and employment) for CAPEX allocations made to the energy sector are excluded from the estimation process. These activities are already accounted for under the Energy sector direct contribution described above.

⁶ Source: Based on total investment data (\$75.9m or 13% - ElectraNet (2021), \$384.1m or 67% - SAPN (2021) and 112.1 or 20% - AGN (AER 2021)).

Table 2-2 Energy CAPEX - SAPN I-O allocations

| Asset class | I-O sector allocation (% of asset class) | % of total CAPEX costs |
|--|---|---------------------------|
| Sub-transmission Lines | Other Construction (90%), ProSciTech (10%) | 0.3% |
| Distribution Lines | Other Construction (90%), ProSciTech (10%) | 23.4% |
| Substations | Other Construction (90%), ProSciTech (10%) | 10.6% |
| Distribution Transformers | Other Construction (90%), ProSciTech (10%) | 1.8% |
| Low Voltage Services | Other Construction (90%), ProSciTech (10%) | 30.3% |
| Communications | Communication Services (100%) | 1.7% |
| Substation Land | NA (100%) | 0.0% |
| Easements | NA (100%) | 0.0% |
| Land | NA (100%) | 0.0% |
| Buildings | Other Construction (100%) | 1.4% |
| Heavy Vehicles - 15 Years | Imports (100%) | 0.2% |
| Heavy Vehicles - 10 Years | Imports (100%) | 2.2% |
| Light Vehicles | Imports (100%) | 1.1% |
| Information Technology | Imports (50%), ProSciTech (50%) | 2.1% |
| Plant and Tools / Office Furniture | Imports (50%), Other Machine Equip (40%), Furniture manufacturing (10%) | 1.0% |
| In-house Software | ProSciTech (100%) | 19.7% |
| Sub-transmission and Distribution Lines - Short Life | Other construction (90%), ProSciTech (10%) | 1.5% |
| Substations and transformers - Short Life | Other construction (90%), ProSciTech (10%) | 0.2% |
| Electronic Network Assets | Other construction (90%), ProSciTech (10%) | 2.6% |
| Total | | 100.0% |

Source: SAPN (2021) and BDO EconSearch analysis

Table 2-3 Energy CAPEX - ElectraNet I-O allocations

| Asset class | I-O sector allocation (% of asset class) | % of total CAPEX costs |
|--|---|---------------------------|
| Commercial Buildings | Other Construction (100%) | 0.2% |
| Communications - Civil | Communication Services (100%) | 1.2% |
| Communications - Other | Communication Services (100%) | 22.6% |
| Computers, software, and office machines | Imports (50%), Other Machine Equip (25%), ProSciTech (25%) | 14.8% |
| Easement | NA (100%) | 0.0% |
| Land | NA (100%) | 0.0% |
| Network Switching Centres | Other Construction (90%), ProSciTech (10%) | 0.0% |
| Office furniture, movable plant, and misc | Imports (50%), Other Machine Equip (40%), Furniture Manufacturing (10%) | 0.3% |
| Refurbishment | Construction Services (100%) | 0.0% |
| Substation Primary Plant | Other Construction (100%) | 16.5% |
| Substation Demountable Buildings | Other Manufacturing (50%), Other Construction (50%) | 2.6% |
| Substation Establishment | Other Construction (100%) | 9.4% |
| Substation Fences | Other Construction (100%) | 0.0% |
| Substation Secondary Systems - Electro-mechanical | Imports (50%), Other Machine Equip (25%), ProSciTech (25%) | 0.0% |
| Substation Secondary Systems - Electronic | Imports (50%), Other Machine Equip (25%), ProSciTech (25%) | 7.8% |
| Transmission lines - Overhead | Other Construction (90%), ProSciTech (10%) | 9.3% |
| Transmission lines - Underground | Other Construction (90%), ProSciTech (10%) | 6.0% |
| Refurbishment 2008-13 | Other Construction (100%) | 0.0% |
| Transmission Line Refit - insulators replacement 2013-18 | Other Construction (90%), ProSciTech (10%) | 8.3% |
| Communications - other (post 2018) | Communication Services (100%) | 0.1% |
| Transmission Line Refit 2018-2023 | Other Construction (90%), ProSciTech (10%) | 0.9% |
| Total | | 100.0% |

Source: ElectraNet (2021) and BDO EconSearch analysis

Table 2-4 Energy CAPEX - Australian Gas Network I-O allocations

| Asset class | I-O sector allocation (% of asset class) | % of total CAPEX costs |
|--|---|---------------------------|
| Pipeline | Other Construction (100%) | 72.2% |
| Offtake facilities (filtration, metering, heating pressure regulation, controls and control hut as required) | Imports (50%), Other Machine Equip (50%) | 6.1% |
| Trunk reticulation | Imports (50%), Other Machine Equip (50%) | 21.8% |
| Total | | 100.0% |

Source: AGN (2018) and BDO EconSearch analysis

Basic metals manufacturing

- Total base metals manufacturing CAPEX was provided by DEM⁷ (\$33m in 2020/21).
- This CAPEX was proportionally split into two asset classes using ABS Private New Capital Expenditure data (ABS Cat No. 5625.0). These being
 - Buildings and Structures (\$8.6m)
 - Equipment, Plant and Machinery (\$24.4m)
- Manufacturing CAPEX by asset class was allocated to I-O sectors for a hypothetical CAPEX scenario (Table 2-5).
- Economic indicators are estimated as the direct impacts of a CAPEX (final demand) shock, as generated by the 79 sector RISE model.

Rooftop solar PV

- A ratio of FTE employment to (change in) small scale solar PV capacity was calculated for the whole of Australia. FTE employment for 2018/19 (latest observation) was sourced from ABS Employment in Renewable Energy Activities (ABS 2020). The increase in solar generation capacity for 2020/21 was sourced from the Clean Energy Regulator (CER 2022) small scale solar installation data.
- The annual increase in small scale rooftop solar PV capacity for SA in 2020/21 (302.2 MW) was obtained from CER (2022).
- SA FTE employment was estimated using the ratio (discussed above) and change in solar generation.
- GVP of solar PV investment was calculated using the SA FTE estimate and the RISE model's final demand estimator. Final demand and resulting direct impacts (economic indicators) were estimated for the residential construction industry.

⁷ Source: DEM, pers. comm., (15/09/22).

Table 2-5 Hypothetical manufacturing CAPEX I-O allocations

| Asset class | I-O sector allocation (% of asset class) | % of total CAPEX costs |
|-------------------------|---|---------------------------|
| Building and structures | Other Construction (75%), Construction Services (25%) | 26.0% |
| Equipment | Other Machinery & Equipment (50%), Imports (50%) | 74.0% |
| Total | | 100.0% |

Source: ABS (2022d) and BDO EconSearch analysis

3. Energy and Mining Economic Indicators

3.1. Economic Indicators

Energy and Mining sector household income, gross operating surplus (GOS), contribution to gross state product (GSP) and employment (both number of jobs and FTEs) for South Australia are summarised in Table 3-1

In 2020/21 the Energy and Mining sector contributed almost \$10.2b to South Australian GSP (8.7 per cent). The largest contributors to GSP, by component of Energy and Mining, were Resources (\$4.2b), Mining Equipment, Technology and Services (METS) (\$2.5b) and Energy (\$1.6b).

Energy and Mining sector employment (FTE) in 2020/21 was approximately 51,800 jobs in South Australia. Of this the largest employing components were METS (19,200 FTE), Resources (13,100 FTE) and Investment Activity (8,400 FTE).

Household income, which is associated with both employment and contribution to GSP, provides a measure of the standard of living of those who are employed in the sector. In 2020/21 about \$4.7 billion was earned by those employed in Energy and Mining. The largest earning components were METS (\$1.5b), Resources (\$1.3b) and Investment Activity (\$0.7b), in line with employment.

Table 3-1 Summary Energy and Mining satellite account, 2020/21

| | GVP (\$m) | Household income (\$m) | Contribution to GOS (\$m) | Contribution to GSP (\$m) | Employment (Jobs) | Employment (FTE) |
|----------------------------|--------------|------------------------------|---------------------------------|---------------------------------|----------------------|---------------------|
| Resources | 8,820 | 1,290 | 2,856 | 4,175 | 10,522 | 13,131 |
| Energy | 2,444 | 617 | 1,010 | 1,647 | 3,829 | 4,315 |
| Manufacturing ^a | 3,418 | 587 | 152 | 760 | 5,710 | 6,783 |
| METS ^b | 5,383 | 1,548 | 919 | 2,503 | 17,798 | 19,209 |
| Investment Activity | 4,180 | 696 | 436 | 1,144 | 7,402 | 8,359 |
| Total^c | | 4,737 | 5,373 | 10,230 | 45,261 | 51,797 |
| South Australia | | 67,496 | 41,096 | 117,506 | 937,879 | 895,760 |
| Total as % of SA | | 7.0% | 13.1% | 8.7% | 4.8% | 5.8% |

^a Includes non-metallic minerals & basic metals.

^b Mining Equipment, Technology and Services (METS) includes sectors at the four digit ANZSIC level that are likely to be wholly or largely servicing the minerals and energy industry e.g. mining and construction machinery manufacturing, site preparation services, engineering design and consulting services, scientific testing and analysis services, and other mining support services.

^c Totals may not sum due to rounding.

Source: BDO EconSearch analysis

Table 3-2 presents a detailed satellite account which shows economic activity attributed to the sub-components of Energy and Mining. Manufacturing sub-components however, are not published in Table 3-2 due to confidentiality. Of these sub-components *Iron & Non Ferrous Mining* was estimated to be the largest contributor to Energy and Mining GSP (\$2.9b). This represented approximately 70 per cent of the contribution to GSP by Resources (\$4.2b in Table 3-1). The next two largest contributors to GSP were *METS* (\$2.5b) and *Electricity Distribution* (\$1.2b relative to \$1.6b for Energy as a whole).

The largest employing (FTE) sub-components of Energy and Mining in 2020/21 were *METS* (19,200 FTE jobs) followed by *Iron & Non Ferrous Mining* (8,700 FTE jobs relative to 13,100 for Resources as a whole) and *Non-metallic Minerals Manufacturing* (not published).

In 2020/21 the largest earning sub-components of household income were *METS* (\$1.5b), followed by *Iron & Non Ferrous Mining* (\$0.9b relative to 1.3b for Resources as a whole) and *Electricity Distribution* (\$0.4b relative to 0.6b for Energy as a whole).

Table 3-2 Detailed Energy and Mining satellite account, 2020/21

| | GVP (\$m) | Household income (\$m) | Contribution to GOS (\$m) | Contribution to GSP (\$m) | Employment (Jobs) | Employment (FTE) |
|---|--------------|------------------------------|---------------------------------|---------------------------------|----------------------|---------------------|
| Resources | | | | | | |
| Coal | | | | | | |
| Oil & Gas Extraction | 1,364 | 333 | 581 | 920 | 2,783 | 3,314 |
| Iron & Non Ferrous Mining | 6,839 | 878 | 2,023 | 2,922 | 6,861 | 8,729 |
| Non Metal Mining | 414 | 60 | 119 | 180 | 695 | 881 |
| Exploration ^a | 203 | 19 | 134 | 153 | 184 | 207 |
| Energy | | | | | | |
| Electricity Generation | 567 | 213 | 87 | 304 | 1,275 | 1,482 |
| Electricity Distribution ^b | 1,680 | 381 | 848 | 1,244 | 2,284 | 2,505 |
| Gas Supply | 197 | 24 | 75 | 100 | 269 | 328 |
| Manufacturing^c | 3,418 | 587 | 152 | 760 | 5,710 | 6,783 |
| METS^d | 5,383 | 1,548 | 919 | 2,503 | 17,798 | 19,209 |
| Investment Activity | | | | | | |
| <i>Resources</i> | | | | | | |
| Construction | 1,178 | 242 | 226 | 472 | 2,573 | 3,135 |
| Mining | 685 | - | - | - | - | - |
| Other sectors | 213 | 78 | 27 | 106 | 786 | 809 |
| <i>Energy^e</i> | | | | | | |
| Construction | 470 | 96 | 95 | 193 | 1,014 | 1,254 |
| Energy, Water & Waste | 454 | - | - | - | - | - |
| Other sectors | 260 | 91 | 16 | 108 | 956 | 987 |
| <i>Basic Metals Manufacturing</i> | | | | | | |
| Construction | 9 | 2 | 1 | 4 | 22 | 26 |
| Other sectors | 24 | 3 | 2 | 5 | 29 | 33 |
| <i>Rooftop Solar PV (dwellings & other sectors)</i> | | | | | | |
| Construction | 887 | 184 | 69 | 256 | 2,023 | 2,115 |
| Total^f | | 4,737 | 5,373 | 10,230 | 45,261 | 51,797 |
| South Australia | | 67,496 | 41,096 | 117,506 | 937,879 | 895,760 |
| Total as % of SA | | 7.0% | 13.1% | 8.7% | 4.8% | 5.8% |

^a Exploration differs from "Exploration and Mining Support Services" in the ABS national I-O tables, as it excludes "Other mining services".

^b "Electricity distribution" refers to the "Electricity Supply" sector in the 78 sector RISE model. See Appendix 1 for a correspondence of RISE and ABS I-O sectors.

^c Includes Non-metallic Minerals, Iron & Steel and Non Ferrous Metals. Sub-components are not reported due to confidentiality.

^d Mining Equipment, Technology and Services includes other mining services. Indicators for "Other mining services" are as follows \$717m GVP, \$257m household income, \$62m GOS, \$369m GSP, 2,201 jobs and 2,923 fte jobs

^e The majority of Energy investment activity is by the Electricity Generation and Distribution sectors. Of total Energy investment, \$1,184m (GVP subtotal for Energy investment activity in Table 3-2), \$1,039m is by the Electricity Generation and Distribution sectors (ABS 2022f), with \$145m remaining for Gas Supply.

^f Totals may not sum due to rounding.

Source: BDO EconSearch analysis

3.2. Energy Costs

Energy costs were extracted from SA RISE I-O model transactions data to highlight the relative scale of energy consumption by different industries in SA. The transactions data provides information relating to purchase of SA produced electricity (generation and distribution separated) and gas by industries in SA. The estimates of energy cost (below) exclude interstate imports of energy as these are not directly allocated to an I-O sector in the I-O model. However, given SA was a small net importer of electricity in 2020/21, we can argue that imports of electricity (generation and distribution) were unlikely to be captured in the I-O model data. Further analysis is required to support this claim. Energy costs in this section exclude any direct purchases of fossil fuels, which align to the Petroleum and Coal Manufacturing sector.

Using the I-O model transactions data, we calculated the cost (of SA produced) energy for SA industries. Energy costs are presented relative to total input costs⁸ and value of production (Table 3-3 and Table 3-4, respectively) so can vary with the relative quantity or price of the inputs.

These input costs can be further contextualised by the ABS Producer Price Indexes (ABS 2022i) which include measures of change in price of electricity and gas inputs across manufacturing at the national level.

Table 3-3 Energy cost as a proportion of total inputs, 2020/21

| Purchasing industry ^a | Electricity Generation | Electricity Distribution ^b | Gas Supply | Total |
|-----------------------------------|------------------------|---------------------------------------|-------------|-------------|
| Agriculture, Forestry and Fishing | 0.5% | 0.8% | 0.0% | 1.3% |
| Mining | 1.9% | 3.4% | 0.2% | 5.5% |
| Manufacturing | 0.9% | 1.6% | 0.5% | 3.1% |
| Construction | 0.1% | 0.1% | 0.0% | 0.2% |
| Trade and transport ^c | 0.7% | 1.3% | 0.1% | 2.0% |
| Public services ^d | 1.0% | 1.8% | 0.1% | 2.9% |
| Other services ^e | 0.4% | 0.7% | 0.4% | 1.6% |
| State total | 0.7% | 1.2% | 0.2% | 2.1% |

^a Purchasing industries refer to industries at the 20 sector level. See Appendix 1 for additional detail.

^b “Electricity distribution” refers to the “Electricity Supply” sector in the 78 sector RISE model. See Appendix 1 for a correspondence of RISE and ABS I-O sectors.

^c Trade and transport consists of Wholesale Trade, Retail Trade, Accommodation & Food Services and Transport, Postal & Warehousing services.

^d Public services consists of Public Administration & Safety, Education & Training and Health Care & Community Services.

^e Other services consists of Electricity, Gas, Water & Waste Services, Information, Media & Telecommunication Services, Finance & Insurance, Rental, Hiring & Real Estate Services, Professional, Scientific & Technical Services, Cultural & Recreational Services and Personal & Other Services.

Source: BDO EconSearch analysis

⁸ These consists of purchases of goods and services and includes interstate and international imports.

Table 3-4 Energy costs as a proportion of total value of output, 2020/21

| Purchasing industry ^a | Electricity Generation | Electricity Distribution ^b | Gas Supply | Total |
|-----------------------------------|------------------------|---------------------------------------|-------------|-------------|
| Agriculture, Forestry and Fishing | 0.1% | 0.2% | 0.0% | 0.4% |
| Mining | 0.6% | 1.1% | 0.1% | 1.8% |
| Manufacturing | 0.4% | 0.7% | 0.2% | 1.3% |
| Construction | 0.0% | 0.1% | 0.0% | 0.1% |
| Trade and transport ^c | 0.3% | 0.4% | 0.0% | 0.7% |
| Public services ^d | 0.2% | 0.4% | 0.0% | 0.6% |
| Other services ^e | 0.1% | 0.2% | 0.1% | 0.4% |
| State total | 0.2% | 0.4% | 0.1% | 0.6% |

^{a-e} See Table 3-3.

Source: BDO EconSearch analysis

4. Conclusions

4.1. Summary

As demonstrated in Section 3.1, Energy and Mining is a significant component of the State economy. The sector contributed about \$10.2 billion to GSP representing about 8.7 per cent of the state economy in 2020/21.

In addition to providing information on the size of the Energy and Mining sector, the satellite account illustrates the large scope of industries which make up the sector. Notably, Resources (i.e. mining and exploration activities) and METS form the majority of Energy and Mining⁹. Notwithstanding the significance of Resources and METS, a sizable amount of Energy and Mining related economic activity can be attributed to Energy, Investment and Manufacturing¹⁰.

4.2. Future Modelling Improvements

This study is an application of a previously developed method (BDO EconSearch 2019) that allows ready compilation and updating of Energy and Mining data.

The development of the satellite account has resulted in identification and incorporation of new data inputs. Producing reliable and consistent updates of Energy and Mining information in the future will be dependent on sourcing similar data. Notably this includes sourcing:

- Investment information relating to SA mining, energy and basic metal manufacturing industries (provided by DEM)
- Value of production data for iron & steel and non-ferrous metals manufacturing (provided by DEM)
- Value of production of electricity providers (sourced from AEMO (2021), AER (2021) and statutory reporting to AER by SAPN and ElectraNet)
- Mining and basic metals manufacturing employment data (provided by DEM).

The above data, where not provided in-confidence or as confidential should be incorporated into other economic models such as the SA state I-O models. Some superior data may be available from other sources. The following areas should continue to be investigated:

- Investment information relating to non-metallic minerals manufacturing
- Value of production data of non-metallic minerals manufacturing
- Employment data for non-metallic minerals manufacturing.

Additionally, there is potential for annual revisions to ABS and other data (e.g. ABS State Accounts) to be incorporated into previous years' estimates to enable the reporting of an energy and mining satellite account time series that reflects such revisions.

⁹ Table 3-1 shows Resources and METS combined contributed about \$6.7b to GSP, out of a total contribution to GSP of \$10.2b.

¹⁰ Table 3-1 shows Energy; Investment activity; and Non-Metallic Minerals & Basic Metals Manufacturing; combined contributed about \$3.6b to GSP, out of a total contribution to GSP of \$10.2b.

Business Longitudinal Analysis Data Environment (BLADE) has also been identified as a potentially more accurate and timely source of Energy and Mining data. BLADE links business activity across many government held administrative data sources¹¹ resulting in high resolution and readily updatable industry data.

Researchers use BLADE to understand how businesses fare over time and the factors that drive performance, innovation, job creation, competitiveness, and productivity, and provide new insights into the development and evaluation of government policies, programs and services (ABS 2022h).

In preparation of this report, BDO EconSearch discussed with SA State Government and ABS representatives a practical approach for using BLADE data to develop future updates of the Energy and Mining satellite accounts. The discussions suggest that adapting the methodology in producing the satellite accounts to make use of BLADE will likely enable more timely and robust estimates.

In order to access BLADE, the Energy and Mining satellite account project will need to be approved as an integrated data project by the ABS. BLADE users are legally obliged to use data responsibly for approved purposes, comply with the conditions of access, and maintain confidentiality of data. Our discussions did not reveal any significant barriers to incorporating BLADE data and we recommend that this path be piloted when producing the next update of this report.

¹¹ E.g. ABS Business Register, ATO Business Activity Statements, DFAT Trade data, etc.

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Disclaimer

The assignment is a consulting engagement as outlined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 17. Consulting engagements employ an assurance practitioner's technical skills, education, observations, experiences and knowledge of the consulting process. The consulting process is an analytical process that typically involves some combination of activities relating to: objective-setting, fact-finding, definition of problems or opportunities, evaluation of alternatives, development of recommendations including actions, communication of results, and sometimes implementation and follow-up.

The nature and scope of work has been determined by agreement between BDO and the Client. This consulting engagement does not meet the definition of an assurance engagement as defined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 10.

Except as otherwise noted in this report, we have not performed any testing on the information provided to confirm its completeness and accuracy. Accordingly, we do not express such an audit opinion and readers of the report should draw their own conclusions from the results of the review, based on the scope, agreed-upon procedures carried out and findings.

APPENDIX 1 Sector Definitions

Appendix Table 1-1 Intermediate sector specifications for the input-output models

| National I-O 111 Sectors (IOIG 2009) | | South Australia, 78 Sector RISE Model, 2019/20 | | South Australia, 20 Sector, 2019/20 | |
|--|----|--|--|---------------------------------------|------------------------------|
| 101 Sheep, Grains, Beef and Dairy Cattle | 1 | 1 | Sheep | 1 Agriculture, Forestry and Fishing | |
| | 2 | 2 | Grains | | |
| | 3 | 3 | Beef Cattle | | |
| | 4 | 4 | Dairy Cattle | | |
| 102 Poultry and Other Livestock | 5 | 5 | Poultry | | |
| | 6 | 6 | Pigs | | |
| | 7 | 7 | Other Livestock | | |
| 103 Other Agriculture | 8 | 8 | Winegrapes | | |
| | 9 | 9 | Vegetables | | |
| | 10 | 10 | Fruit and Nuts | | |
| | 11 | 11 | Other Agriculture | | |
| 201 | 12 | 12 | Aquaculture | | |
| 301 | 13 | 13 | Forestry and Logging | | |
| 401 | 14 | 14 | Fishing, Hunting and Trapping | | |
| 501 | 15 | 15 | Agriculture, Forestry and Fishing Support Services | | |
| 601 | 16 | 16 | Coal Mining | 2 Mining | |
| 701 | 17 | 17 | Oil and Gas Extraction | | |
| 801 | 18 | 18 | Iron & Non-ferrous Ore Mining | | |
| 802 | | | | | Non Ferrous Metal Ore Mining |
| 901 | 19 | 19 | Non Metallic Mineral Mining | | |
| 1001 | 20 | 20 | Exploration and Mining Support Services | | |
| 1101 | 21 | 21 | Meat and Meat Product Manufacturing | | 3 Manufacturing |
| 1102 | 22 | 22 | Processed Seafood Manufacturing | | |
| 1103 | 23 | 23 | Dairy Product Manufacturing | | |
| 1104 | 24 | 24 | Fruit and Vegetable Product Manufacturing | | |
| 1105 | 25 | 25 | Oils and Fats Manufacturing | | |
| 1106 | 26 | 26 | Grain Mill and Cereal Product Manufacturing | | |
| 1107 | 27 | 27 | Other Food Product Manufacturing | | |
| 1108 | | | | Sugar and Confectionary Manufacturing | |
| 1109 | | | | Other Food Product Manufacturing | |

| National I-O 111 Sectors (IOIG 2009) | | South Australia, 78 Sector RISE Model, 2019/20 | South Australia, 20 Sector, 2019/20 |
|---|---|--|-------------------------------------|
| 1201 Soft Drinks, Cordials and Syrup Manufacturing | 28 Other Beverages | 3 | Manufacturing (cont.) |
| 1202 Beer Manufacturing | 29 Beer Manufacturing | | |
| 1205 Wine, Spirits and Tobacco | 30 Wine, Spirits and Tobacco Manufacturing | | |
| 1301 Textile Manufacturing | 31 Textiles, Clothing and Footwear Manufacturing | | |
| 1302 Tanned Leather, Dressed Fur and Leather Product Manufacturing | | | |
| 1303 Textile Product Manufacturing | | | |
| 1304 Knitted Product Manufacturing | | | |
| 1305 Clothing Manufacturing | | | |
| 1306 Footwear Manufacturing | | | |
| 1401 Sawmill Product Manufacturing | 32 Sawmill Product Manufacturing | | |
| 1402 Other Wood Product Manufacturing | 33 Other Wood Product Manufacturing | | |
| 1501 Pulp, Paper and Paperboard Manufacturing | 34 Pulp, Paper and Paperboard Manufacturing | | |
| 1502 Paper Stationery and Other Converted Paper Product Manufacturing | 35 Paper Stationery and Other Converted Paper Product Manufacturing | | |
| 1601 Printing (including the reproduction of recorded media) | 36 Printing (including the reproduction of recorded media) | | |
| 1701 Petroleum and Coal Product Manufacturing | 37 Petroleum and Coal Product Manufacturing | | |
| 1801 Human Pharmaceutical and Medicinal Product Manufacturing | 38 Pharmaceutical & Other Chemical Product Manufacturing | | |
| 1802 Veterinary Pharmaceutical and Medicinal Product Manufacturing | | | |
| 1803 Basic Chemical Manufacturing | | | |
| 1804 Cleaning Compounds and Toiletry Preparation Manufacturing | | | |
| 1901 Polymer Product Manufacturing | | | |
| 1902 Natural Rubber Product Manufacturing | | | |
| 2001 Glass and Glass Product Manufacturing | 39 Non-metallic Mineral Product Manufacturing | | |
| 2002 Ceramic Product Manufacturing | | | |
| 2003 Cement, Lime and Ready-Mixed Concrete Manufacturing | | | |
| 2004 Plaster and Concrete Product Manufacturing | | | |
| 2005 Other Non-Metallic Mineral Product Manufacturing | | | |
| 2101 Iron and Steel Manufacturing | 40 Iron and Steel Manufacturing | | |
| 2102 Basic Non-Ferrous Metal Manufacturing | 41 Basic Non-Ferrous Metal Manufacturing | | |

| National I-O 111 Sectors (IOIG 2009) | | South Australia, 78 Sector RISE Model, 2019/20 | South Australia, 20 Sector, 2019/20 |
|--|--|--|-------------------------------------|
| 2201 Forged Iron and Steel Product Manufacturing | 42 Metal Product Manufacturing | 3 Manufacturing (cont.) | |
| 2202 Structural Metal Product Manufacturing | | | |
| 2203 Metal Containers and Other Sheet Metal Product manufacturing | | | |
| 2204 Other Fabricated Metal Product manufacturing | | | |
| 2301 Motor Vehicles and Parts; Other Transport Equipment manufacturing | 43 Motor Vehicles and Parts; Other Transport Equipment Manufacturing | 4 Electricity, Gas, Water and Waste services | |
| 2302 Ships and Boat Manufacturing | 44 Other Machinery & Equipment Manufacturing | | |
| 2303 Railway Rolling Stock Manufacturing | | | |
| 2304 Aircraft Manufacturing | | | |
| 2401 Professional, Scientific, Computer and Electronic Equipment Manufacturing | | | |
| 2403 Electrical Equipment Manufacturing | | | |
| 2404 Domestic Appliance Manufacturing | | | |
| 2405 Specialised and other Machinery and Equipment Manufacturing | | | |
| 2501 Furniture Manufacturing | 45 Furniture Manufacturing | | |
| 2502 Other Manufactured Products | 46 Other Manufactured Products | | |
| 2601 Electricity Generation | 47 Electricity Generation | | |
| 2605 Electricity Transmission, Distribution, On Selling and Electricity Market Operation | 48 Electricity Supply | | |
| 2701 Gas Supply | 49 Gas Supply | | |
| 2801 Water Supply, Sewerage and Drainage Services | 50 Water Supply, Sewerage and Drainage Services | | |
| 2901 Waste Collection, Treatment and Disposal Services | 51 Waste Collection, Treatment and Disposal Services | | |
| 3001 Residential Building Construction | 52 Residential Building Construction | 5 Construction | |
| 3002 Non-Residential Building Construction | 53 Other Construction | | |
| 3101 Heavy and Civil Engineering Construction | | | |
| 3201 Construction Services | 54 Construction Services | | |
| 3301 Wholesale Trade | 55 Wholesale Trade | 6 Wholesale Trade | |
| 3901 Retail Trade | 56 Retail Trade | 7 Retail Trade | |
| 4401 Accommodation | 57 Accommodation | 8 Accommodation and Food Services | |
| 4501 Food and Beverage Services | 58 Food and Beverage Services | | |

| National I-O 111 Sectors (IOIG 2009) | | South Australia, 78 Sector RISE Model, 2019/20 | South Australia, 20 Sector, 2019/20 |
|--|--|--|---|
| 4601 Road Transport | 59 Road Transport | 9 | Transport, postal and warehousing |
| 4701 Rail Transport | 60 Rail Transport | | |
| 4801 Water, Pipeline and Other Transport | 61 Water, Pipeline and Other Transport | | |
| 4901 Air and Space Transport | 62 Air and Space Transport | | |
| 5101 Postal and Courier Pick-up and Delivery Service | 63 Transport Support Services and Storage | | |
| 5201 Transport Support services and storage | | | |
| 5401 Publishing (except Internet and Music Publishing) | 64 Publishing (except Internet and Music Publishing) | 10 | Information, Media and Telecommunications |
| 5501 Motion Picture and Sound Recording | 65 Communication Services | | |
| 5601 Broadcasting (except Internet) | | | |
| 5701 Internet Publishing and Broadcasting and Services Providers, Websearch Portals and Data Processing Services | | | |
| 5801 Telecommunication Services | | | |
| 6001 Library and Other Information Services | | | |
| 6201 Finance | | | |
| 6301 Insurance and Superannuation Funds | 67 Insurance & Other Financial Services | | |
| 6401 Auxiliary Finance and Insurance Services | | | |
| 6601 Rental and Hiring Services (except Real Estate) | 68 Rental, Hiring and Real Estate Services | 12 | Rental, Hiring and Real Estate Services |
| 6701 Ownership of Dwellings | 69 Ownership of Dwellings | 13 | Ownership of Dwellings |
| 6702 Non-Residential Property Operators and Real Estate Services | 68 Rental, Hiring and Real Estate Services (cont.) | 12 | Rental, Hiring and Real Estate Services (cont.) |
| 6901 Professional, Scientific and Technical Services | 70 Professional, Scientific and Technical Services | 14 | Professional, Scientific and Technical Services |
| 7001 Computer Systems Design and Related Services | | | |
| 7201 Building Cleaning, Pest Control, Administrative and Other Support Services | 71 Administrative and Support Services | 15 | Administrative and Support Services |
| 7501 Public Administration and Regulatory Services | 72 Public Administration and Regulatory Services | 16 | Public Administration and Safety |
| 7601 Defence | 73 Defence | | |
| 7701 Public Order and Safety | 74 Public Order and Safety | | |
| 8001 Education and Training | 75 Education and Training | 17 | Education and Training |

| National I-O 111 Sectors (IOIG 2009) | | South Australia, 78 Sector RISE Model, 2019/20 | South Australia, 20 Sector, 2019/20 |
|--|-------------------------------------|---|-------------------------------------|
| 8401 Health Care Services | 76 Health & Community Services | 18 Health & Community Services | |
| 8601 Residential Care and Social Assistance Services | | | |
| 8901 Heritage, Creative and Performing Arts | 77 Cultural & Recreational Services | 19 Cultural & Recreational Services | |
| 9101 Sports and Recreation | | | |
| 9201 Gambling | | | |
| 9401 Automotive Repair and Maintenance | 78 Personal & Other Services | 20 Personal & Other Services | |
| 9402 Other Repair and Maintenance | | | |
| 9501 Personal Services | | | |
| 9502 Other Services | | | |

APPENDIX 2 Energy and Mining correspondence to ANZSIC (3 digit level industry)

Appendix Table 2-2 Energy and Mining components and sub-components to ANZSIC (3 digit level industry)

| Energy and Mining components | Energy and Mining sub-components | ANZSIC code (3 digit) | Description |
|---|--|---|--|
| Resources | Coal | 60 | Coal Mining |
| | Oil & Gas Extraction | 70 | Oil and Gas Extraction |
| | Iron & Non Ferrous Mining | 80 | Metal Ore Mining |
| | Non Metal Mining | 91 | Construction Material Mining |
| | Non Metal Mining | 99 | Other Non-Metallic Mineral Mining and Quarrying |
| | Exploration | 101 | Exploration |
| Energy | Electricity Generation | 261 | Electricity Generation |
| | Electricity Supply | 262 | Electricity Transmission |
| | | 263 | Electricity Distribution |
| | | 264 | On Selling Electricity and Electricity Market Operation |
| Gas Supply | 270 | Gas Supply | |
| Manufacturing (non-metallic minerals & basic metals) | Non-metallic minerals | 201 | Glass and Glass Product Manufacturing |
| | | 202 | Ceramic Product Manufacturing |
| | | 203 | Cement, Lime, Plaster and Concrete Product Manufacturing |
| | | 209 | Other Non-Metallic Mineral Product Manufacturing |
| | Iron & Steel | 211 | Basic Ferrous Metal Manufacturing |
| | | 212 | Basic Ferrous Metal Product Manufacturing |
| Non Ferrous Metals | 213 | Basic Non-Ferrous Metal Manufacturing | |
| | 214 | Basic Non-Ferrous Metal Product Manufacturing | |
| Mining Equipment, Technology & Services | Mining Equipment, Technology & Services | 109 | Other Mining Support Services |
| | | n.a. | Miscellaneous sectors (from parts of ANZSIC 3 digit sectors) |
| Investment activity | Resources (construction investment activity) | 301 | Residential Building Construction |
| | | 302 | Non-Residential Building Construction |
| | | 310 | Heavy and Civil Engineering Construction |
| | | 321 | Land Development and Site Preparation Services |
| | | 322 | Building Structure Services |
| | | 323 | Building Installation Services |
| | | 324 | Building Completion Services |
| | | 329 | Other Construction Services |

| Energy and Mining components | Energy and Mining sub-components | ANZSIC code (3 digit) | Description |
|------------------------------|---|-----------------------|--|
| Investment activity (cont.) | Resources (other sectors investment activity) | 262 | Electricity Transmission |
| | | 263 | Electricity Distribution |
| | | 264 | On Selling Electricity and Electricity Market Operation |
| | | 551 | Motion Picture and Video Activities |
| | | 552 | Sound Recording and Music Publishing |
| | | 561 | Radio Broadcasting |
| | | 562 | Television Broadcasting |
| | | 570 | Internet Publishing and Broadcasting |
| | | 591 | Internet Service Providers and Web Search Portals |
| | | 592 | Data Processing, Web Hosting and Electronic Information Storage Services |
| | | 580 | Telecommunications Services |
| | | 601 | Libraries and Archives |
| | | 602 | Other Information Services |
| | | 691 | Scientific Research Services |
| | | 692 | Architectural, Engineering and Technical Services |
| | | 693 | Legal and Accounting Services |
| | | 694 | Advertising Services |
| | | 695 | Market Research and Statistical Services |
| | | 696 | Management and Related Consulting Services |
| | | 697 | Veterinary Services |
| | | 699 | Other Professional, Scientific and Technical Services |
| | Energy (construction investment activity) | 302 | Non-Residential Building Construction |
| | | 310 | Heavy and Civil Engineering Construction |
| | Energy (other sectors investment activity) | 239 | Other Transport Equipment Manufacturing |
| | | 241 | Professional and Scientific Equipment Manufacturing |
| | | 242 | Computer and Electronic Equipment Manufacturing |
| | | 243 | Electrical Equipment Manufacturing |
| | | 244 | Domestic Appliance Manufacturing |
| | | 245 | Pump, Compressor, Heating and Ventilation Equipment Manufacturing |
| | | 246 | Specialised Machinery and Equipment Manufacturing |
| | | 249 | Other Machinery and Equipment Manufacturing |
| | | 251 | Furniture Manufacturing |
| | | 259 | Other Manufacturing |

| Energy and Mining components | Energy and Mining sub-components | ANZSIC code (3 digit) | Description |
|------------------------------|--|-----------------------|--|
| Investment activity (cont.) | Energy (other sectors investment activity Cont.) | 551 | Motion Picture and Video Activities |
| | | 552 | Sound Recording and Music Publishing |
| | | 561 | Radio Broadcasting |
| | | 562 | Television Broadcasting |
| | | 570 | Internet Publishing and Broadcasting |
| | | 591 | Internet Service Providers and Web Search Portals |
| | | 592 | Data Processing, Web Hosting and Electronic Information Storage Services |
| | | 580 | Telecommunications Services |
| | | 601 | Libraries and Archives |
| | | 602 | Other Information Services |
| | | 691 | Scientific Research Services |
| | | 692 | Architectural, Engineering and Technical Services |
| | | 693 | Legal and Accounting Services |
| | | 694 | Advertising Services |
| | | 695 | Market Research and Statistical Services |
| | | 696 | Management and Related Consulting Services |
| | | 697 | Veterinary Services |
| | | 699 | Other Professional, Scientific and Technical Services |
| | | 700 | Computer System Design and Related Services |
| | Solar PV (construction investment activity) | 301 | Residential Building Construction |
| | Basic Metals Manufacturing (construction investment activity) | 302 | Non-Residential Building Construction |
| | | 310 | Heavy and Civil Engineering Construction |
| | | 321 | Land Development and Site Preparation Services |
| | | 322 | Building Structure Services |
| | | 323 | Building Installation Services |
| | | 324 | Building Completion Services |
| | | 329 | Other Construction Services |
| | Basic Metals Manufacturing (other sectors investment activity) | 239 | Other Transport Equipment Manufacturing |
| | | 241 | Professional and Scientific Equipment Manufacturing |
| | | 242 | Computer and Electronic Equipment Manufacturing |
| | | 243 | Electrical Equipment Manufacturing |

Source: BDO EconSearch analysis



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