Earth Resources Sector Indicators

FY 2021–22

RESOURCES VICTORIA

The Victorian Government acknowledges Aboriginal Traditional Owners of Country throughout Victoria and pays respect to their cultures and Elders past and present.

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Introduction

The *Earth Resources Sector Indicators* (ERSI) *Report* is produced to promote a shared understanding of the sector and enable effective earth resources decision-making.

The ERSI is intended to:

- provide a common and easily accessible set of metrics for stakeholder reference;
- complement existing earth resources reporting requirements; and
- highlight opportunities to develop additional sector indicators for future report.

Mineral Exploration Activity

527,428[1]

Metres drilled

$222.2 million

Exploration expenditure

Metres drilled for 2021-22 surpassed the all-time high set last financial year, increasing by 12.8 per cent from 467,585 metres drilled in 2020-21 to 527,428 metres in 2021-22.

The majority drilling occurred under exploration and mining licences (Table 1). 2021-22 achieved a record number of exploration licences, up significantly from 2020-21 levels, highlighting a strong interest in exploration investment.

Minerals exploration expenditure also increased by almost 21 per cent, up from $183.9 million recorded in 2020-21 to $222.2 million in 2021-22.[2]

Over the past five years, Victoria has averaged 42 per cent growth in minerals exploration expenditure (Figure 1), doubling that the national average (20 per cent over five-years) and is consistent with Victoria's increased share of national expenditure over the past five years, reaching 5.7 per cent share in 2021-22.[3]

Gold exploration was the primary driver of overall mineral exploration expenditure in Victoria, recording $141.7 million in 2021-22, down slightly from 2020-21 (-5.1 per cent) but continuing the trend of record levels of exploration expenditure seen during the 2020-21 financial year (Figure 2). Mineral sands exploration increased notably in 2021-22, doubling from 2020-21 levels to reach $34.5 million, a 110.4 per cent increase year-on-year.[4]

1 Note: September 2023 estimation of FY2021-22, only 18 per cent of the metres claimed have been substantiated through a full audit of the reports and data. The FY2021-22 statistics are subject to change once a robust audit can be completed.
2 Australian Bureau of Statistics, 8412.0, Mineral and Petroleum Exploration, released 04/09/2023.
3 Australian Bureau of Statistics, 8412.0, Mineral and Petroleum Exploration, released 04/09/2023.
4 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 15.

Table 1: Metres drilled per minerals tenement[5]

Tenement Type	Metres
Exploration Licences	235,020
Retention Licences	71,115
Mining Licences	221,293
Total	**527,428**

Figure 1: Mineral exploration expenditure ($ million, seasonally adjusted)[6]

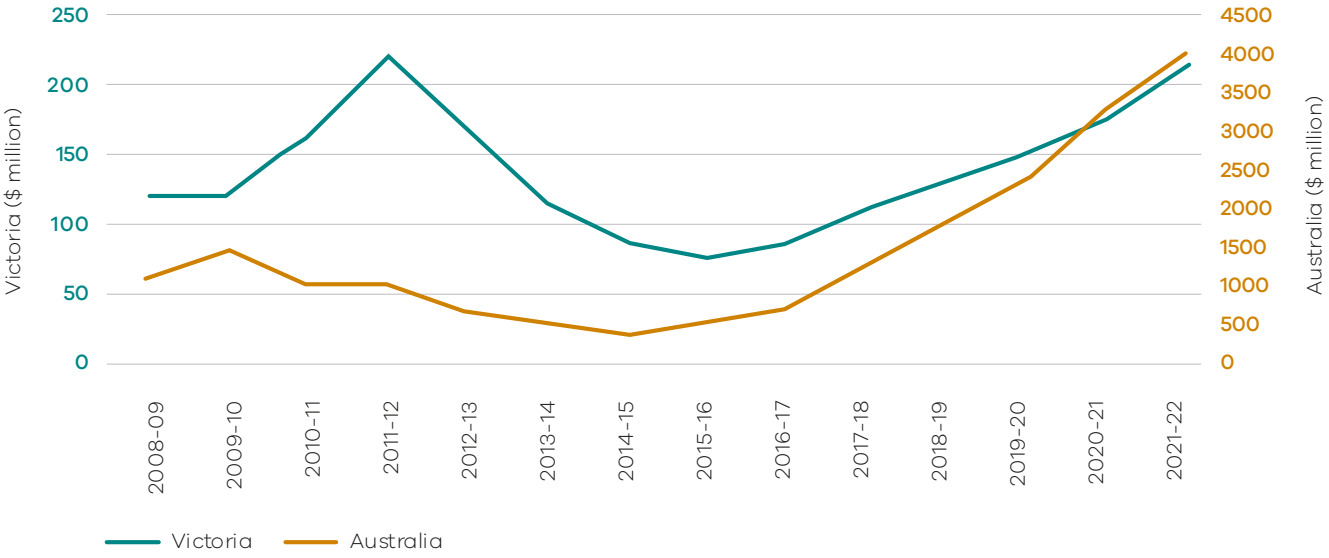
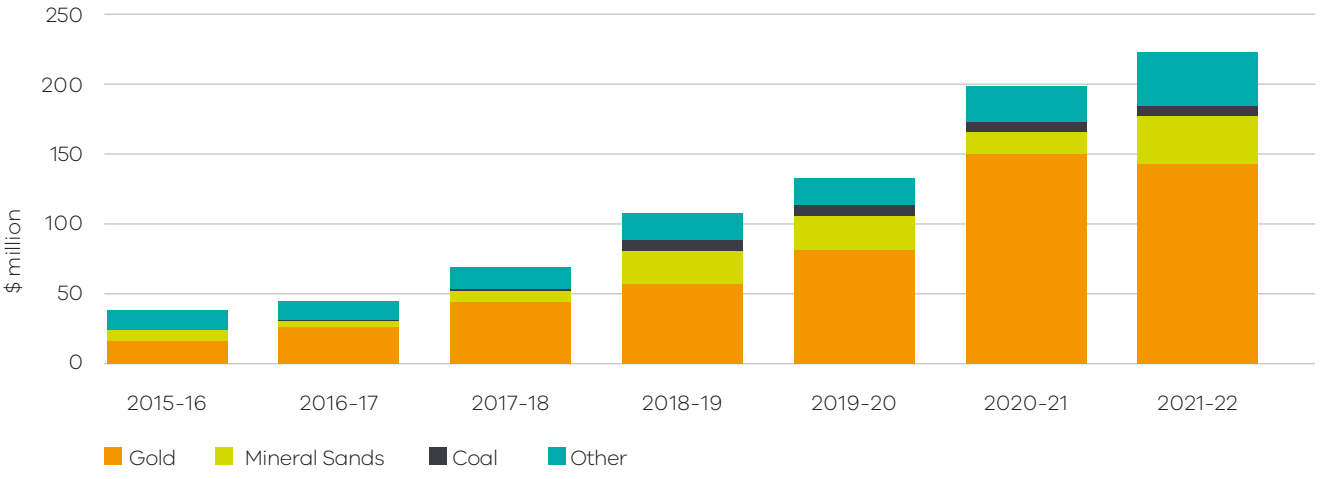


Figure 2: Mineral exploration expenditure by commodity and financial year ($ million)[7]



* "Other" includes cases where there are more than one primary mineral.

5 Geological Survey of Victoria, Unpublished Data.
6 Australian Bureau of Statistics, 8412.0, Mineral and Petroleum Exploration, released 04/09/2023.
7 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 15.

Licences and Regulatory Fees

83

New mineral licences granted

12

Renewed mineral licences*

$6.7 million

Revenue from regulatory fees**

In 2021-22, both new and renewed mineral licences granted decreased from 2020-21 levels (Figure 3).[8]

- New mineral licences granted fell 18 per cent with 83 licences granted in 2021-22, down from 101 in 2020-21.
- Renewed mineral licences decreased 43 per cent to 12 renewed licences in 2021-22 from 21 the year prior.

Despite this decrease in total number of licences granted or renewed, the total number of active licences reached a ten-year high. 577 total active licences were recorded in 2021-22 (Table 2). Active exploration licences drove this increase, also recording a ten-year high, increasing by 22.7 per cent year-on-year. Mining activity will therefore likely remain relatively steady over the near-term.

This increase is also highlighted in the number of applications submitted to ERR received over the same reporting period.

Regulatory fees collected increased slightly, up 3.1 per cent from $6.5 million in 2020-21 to $6.7 million in 2021-22. These fees include regulatory charges for licences, the Mine Stability Levy and other rent related charges for exploration and mining licences under the Mineral Resources Sustainable Development Act (MRSDA). Over the past five years, regulatory charges and rent fees have seen an average increase of 1.0 per cent and 3.5 per cent respectively, with the Mine Stability Levy remaining constant at $1.5 million per annum (Figure 4).

* Mineral licences refers to the four mineral licence types: exploration, retention, mining and prospecting)

** Victorian Government departments and agencies charge a range of fees for regulatory purposes, including licencing

8 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 23.

Figure 3: Licences granted or renewed for 2021-22[9]

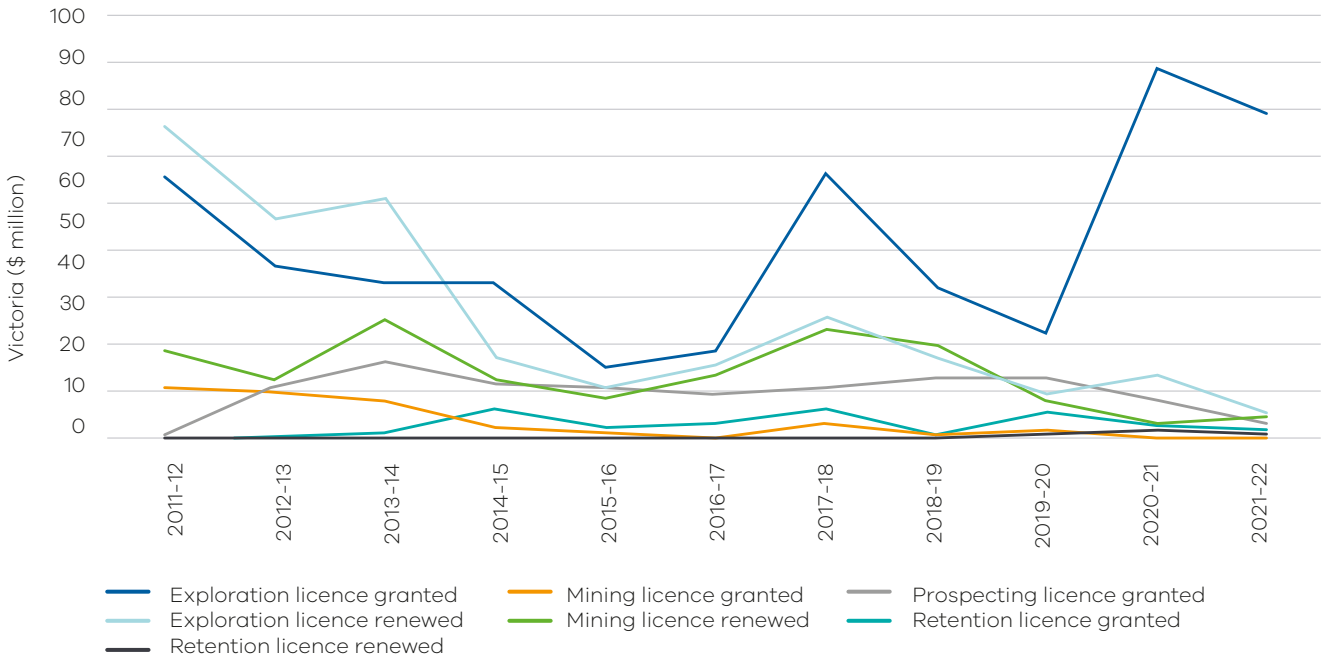
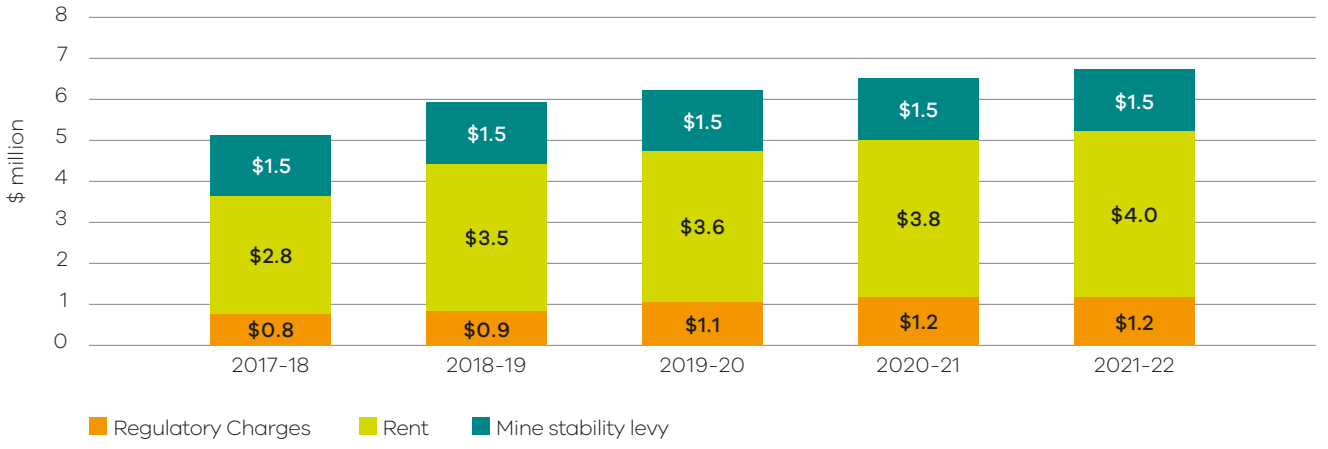


Table 2: Current mineral tenement as of 30 June 2023[10]

Tenement type	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Exploration licences	311	271	247	211	180	200	212	217	291	357
Mining licences	212	191	171	170	162	156	145	141	139	131
Prospecting licences	13	31	41	51	54	59	55	60	66	57
Retention licences	1	1	8	11	15	20	21	27	30	32
Totals	537	494	467	443	411	435	433	445	526	577
Change year-on-year (%)	+0.4	-8.0	-5.5	-5.1	-7.2	+5.8	-0.5	+2.8	+18.2	+9.7

Figure 4: Regulatory fees[11]



9 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 24.
10 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 21.
11 Earth Resources Regulation, Annual Statistical Report 2021-22, p. 35.

Miner's Rights

9,215

Number of miner's rights

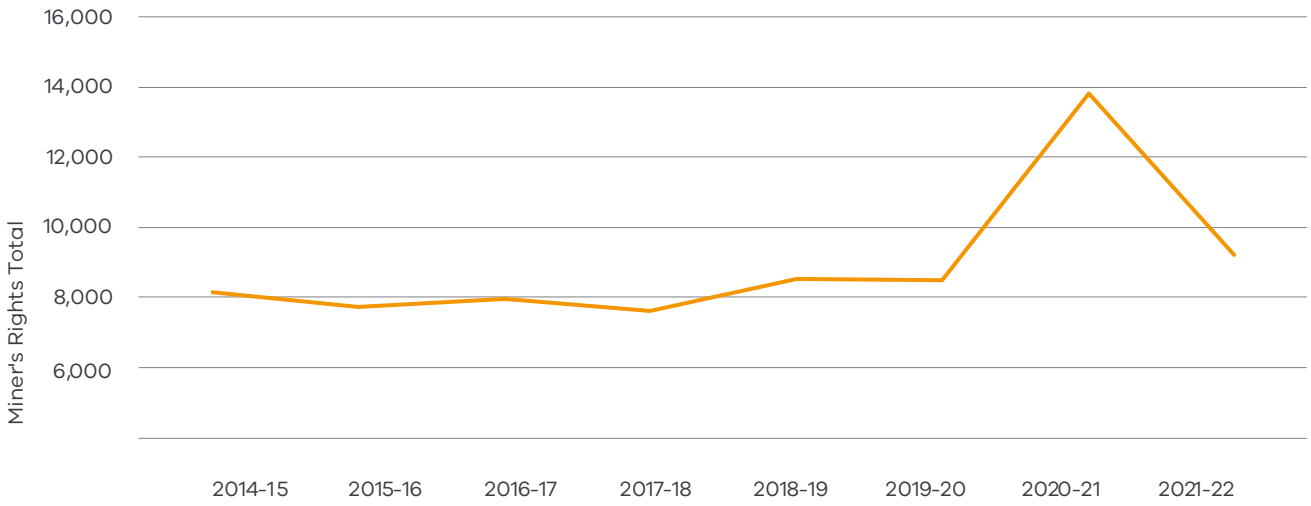
The number of new miner's rights in Victoria decreased year-on-year in 2021-22.

New miner's rights granted decreased by 33.4 per cent – from 13,835 in 2020-21 down to 9,215 in 2021-22.

Miner's rights enable recreational prospectors to search, remove and keep gold, gemstones and other minerals on Crown land or private land where the activity is allowed. Miner's rights are purchased through Service Victoria and are valid for ten years.[12]

Despite a notable drop from the 2020-21 financial year, new miner's rights in 2021-22 returned to average levels recorded before the spike in applications the year prior (Figure 5). Miner's rights over the past eight years averaged 8,937 and when excluding the 2021-21 spike, the average rights granted per year was 8,237, 12 per cent below the total number of miner's rights recorded in 2021-22.

Figure 5: Number of miner's rights sold[13]



12 Note: These figures that are published in each Earth Resources Sector Indicators edition may differ from year to year. In earlier years, on average 80 per cent of miner's rights were sold "online" and the remainder 20 per cent were sold through "agent sales" where a lag between reporting occurred resulting in some discrepancies between years. Since 2019-20, all online sales were moved over to Service Victoria. Further, due to process changes and COVID-19 pandemic impacts, book sales were also phased out in 2019-20. Agent sales are thereby now managed through the Service Victoria system.

13 Earth Resources Regulator, unpublished data.


MINELAB

Capital Expenditure

$737 million

New capital expenditure

Capital expenditure in Victoria's resources sector bounced back after a string of consecutive years of decline to reach $737 million in 2021-22.[14]

- Private new capital expenditure increased 19 per cent – from $618 million in 2020-21 to $737 million in 2021-22.

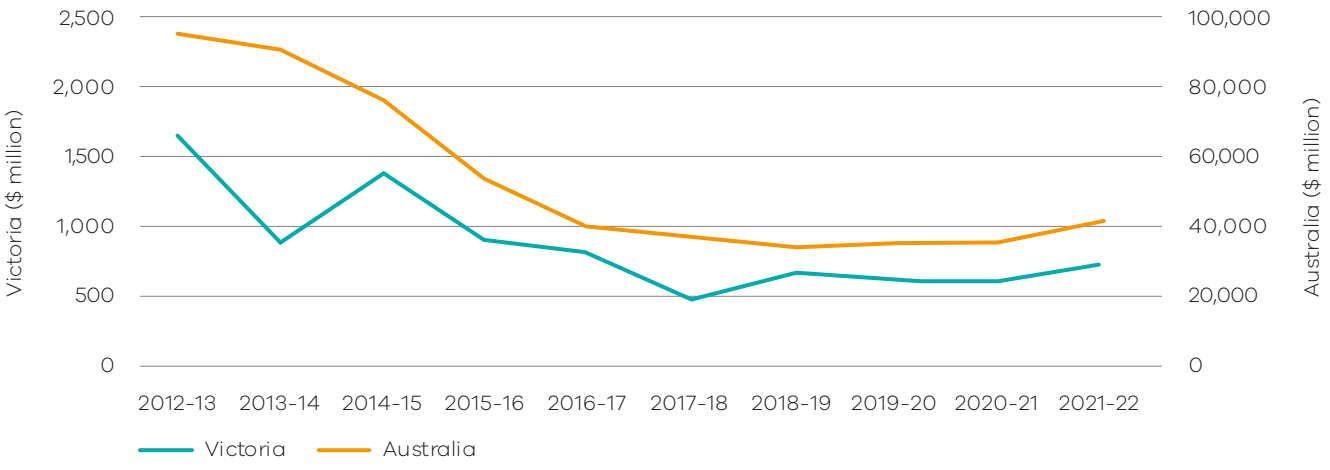
Victorian capital expenditure largely aligned with trends recorded at a national level, which also increased during the 2021-22 financial year, up 17.6 per cent from 2020-21 levels (Figure 6). The uptick in Victorian expenditure may suggest the logistical and cash flow pressures experienced in the 2019-20 financial year, due to the COVID-19 pandemic, may be alleviating, with fewer operators reporting disruptions linked to COVID-19, both within Victoria and across the country. However, expenditure remains significantly below the last peak seen in 2011-12 where spending reached $2.15 billion.

Upcoming projects can be a reliable lead indicator of future capital expenditure. Victoria has a total of 25 major projects with a value ranging from $5.7 billion to $8 billion (Table 3), up from 22 projects in 2020-21 and up notably from 2019-20 levels (16 major projects recorded). Once projects reach final investment stage, further capital expenditure will likely be injected into the sector, thereby stimulating additional growth in the Victorian economy.

Table 3: Victorian major projects as of 31 October 2022[15]

Stage	Projects (No.)	Value ($ billion)
Publicly announced	13	3.0 – 4.6
Feasibility	7	1.6 – 2.3
Committed	3	0.6
Completed	2	0.5
Total	**25**	**5.7 – 8.0**

Figure 6: Private new capital expenditure ($ million)[16]



14 Australian Bureau of Statistics, 5625.0, Private New Capital Expenditure and Expected Expenditure, released 31/08/2023.
15 Office of the Chief Economist, Resources and Energy Major Projects: 2022. Note: These projects span several resource sector commodities.
16 Australian Bureau of Statistics, 5625.0, Private New Capital Expenditure and Expected Expenditure, released 31/08/2023.

Production

Quantity:

- Minerals: Due to different units of measurement per commodity, no total is included here (see Table 4 for breakdown)
- Extractives: 69.9 million tonnes (Table 7)

Sales Value: Total – $2,825.2 million

- Minerals: $1,668.3 million
- Extractives: $1,156.9 million

Total sales volume decreased in 2021-22 from $2944.8 million to $2,825.2 million – down 4 per cent year-on-year. Minerals sales value decreased 9 per cent from $1,832.4 million in 2020-21 to $1,668.3 million (Table 5). Extractives saw an increase in both production and sales value from 2020-21 levels. Production increased by 4.7 per cent from 66,780 thousand tonnes in 2020-21 to 69,901 thousand tonnes in 2021-22. Sales values increased 4.0 per cent (Table 7).

Victoria has a less diverse resource endowment and production of minerals compared to other Australian jurisdictions. Other jurisdictions have announced various policy initiatives and programs to stimulate certain areas of its resources sector, notably within the critical minerals space.

Table 4: Mineral production[17]

Commodity	Unit	2020-21	2021-22	Change (%)
Brown coal	Tonnes (thousand)	42,263	39,127	-7.4
Gold	Ounce	722,239	627,011	-13.2
Antimony	Tonnes	3,551	2,896	-18.4
Zircon*	Tonnes	0	0	N/A
Rutile*	Tonnes	0	0	N/A
Ilmenite*	Tonnes	0	0	N/A
Gypsum	Cubic metres	679,741	836,249	+23.0
Kaolin & fine clay	Tonnes	172,983	167,133	-3.4

* For 2021-22, no production occurred for these materials.

Table 5: Mineral production sales values ($ million)[18]

Commodity	2020-21	2021-22	Change (%)
Gold	1,781.5	1,592.5	-10.6
Antimony	36.7	58.2	+58.6
Heavy metals sands (incl. zircon, rutile, ilmenite)	0.0	0.0	N/A
Industrial minerals (incl. feldspar, gypsum, kaolin & fine clay)	13.6	15.5	+14.0
Other minerals (incl. silver, peat, quartz and tailings)	0.60	2.1	+250
Total (excl. brown coal)	1,832.40	1,668.30	-9.0

17 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 19.
18 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 19. Note: No unit value is assigned to brown coal for the purposes of determining its production value. Brown coal is almost entirely used for electricity production and is largely an internal transfer within mining/generation entities. As such, there is no available market price for brown coal.

Gold

627,011 ounces

Gold production

Gold production in Victoria decreased year-on-year in 2021-22 (Figure 7).[19]

- Gold production decreased by 13.2 per cent – from 722,239 ounces in 2020-21 to 627,011 ounces in 2021-22.
- Sales value of gold produced decreased by 10.6 per cent – from $1.78 billion in 2020-21 to $1.59 billion in 2021-22.
- Gold mining operations expenditure recorded an increase of 6.6 per cent from $401.2 million to $427.5 million in 2021-22.[20]

While production numbers and sales value have decreased in the 2021-22 financial year, the 2019-20 and 2020-21 financial years saw record high levels of production and sales value, reaching levels not seen since 1906.[21] Both production and sales value remain elevated compared to the ten-year average as interest within the industry remains strong.

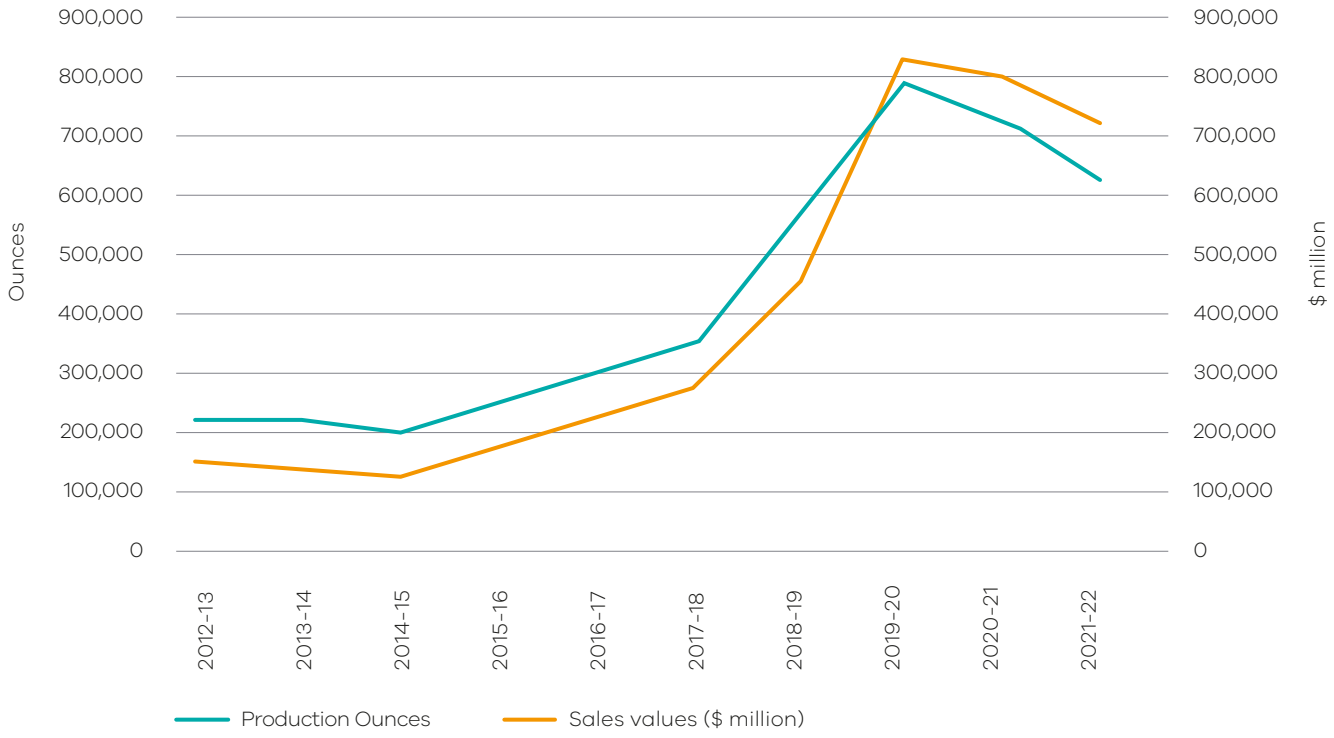
Fosterville gold mine remains the dominate producer of Victorian gold. In 2022, Fosterville produced 338,327 ounces of gold and has a capacity of processing 2,275 tonnes of gold per day.[22] As of December 2022, Fosterville's proven mineral reserves are 679,000 ounces of gold, with probable mineral reserves of 1.3 million ounces of gold.

In the 2022 calendar year, gold prices continued to surge from record levels seen during the 2019-20 financial year, averaging US$1,801 (A$2,600).[23] Despite strong prices early on in 2022, gains were offset during the latter half of the year by rising inflation and tightening of monetary and fiscal policies across advanced economies. Global gold prices are forecast to fall at an average annual rate of 4.9 per cent from US$1,800 an ounce in 2022 to US$1,625 an ounce in 2024.[24]

Fewer gold mines reported production impacts from labour shortages and logistical issues related to COVID-19 outbreaks over the second half of the 2022 calendar year. However, increased cost pressures on operations and expansions were also reported during the same period as global inflationary pressures began to take hold.

19 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 5.
20 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 5.
21 Data updated from Gavin Mudd (2007) (courtesy G M Mudd)
22 Agnico Eagle, Fosterville Mine Information, accessed on 19/09/2023.
23 Office of the Chief Economist, Resources and Energy Quarterly, December 2022 p. 100.
24 Office of the Chief Economist, Resources and Energy Quarterly, December 2022 p. 103.

Figure 7: Gold production and sales values[25]



25 Earth Resources Regulation, Annual Statistical Reports, 2012-2022.

Gas

9.50 petajoules (PJ)

Gas production

Gas produced in Victorian coastal waters increased year-on-year in 2021-22 (Table 6).[26]

- Gas production increased 16.3 per cent from 8.17 PJ in 2020-21 to 9.50 PJ in 2021-22 (Figure 8).

Gas is supplied to Victorian customers from developments in Victoria and from the offshore area, largely from offshore gas reserves in the Bass Strait. Annual supply from offshore Victoria (Commonwealth and state waters) in 2022 was 374.0 PJ, up 13 per cent year-on-year.[27] Underground gas storage fell 22.8 per cent to 13.52 PJ in 2021-22 back down to pre-pandemic storage levels, following two years of strong storage levels.[28]

Victorian consumption for both the 2021 and 2022 calendar years increased from 2020-levels. In 2021 and 2022, total Victorian Declared Transmission System consumption recorded 207.0 PJ and 207.3 PJ, respectively – up from 201.0 PJ consumed in 2020.[29]

Recent forecasts by the Australian Energy Market Operator have highlighted key issues in future gas supply, noting that supply is forecast to be adequate until 2027 from existing, committed and anticipated projects.[30] While gas will continue to have a role in the short term, the government has signalled its intention to move the State away from gas and deliver action on climate change to achieve net zero emissions by 2045.

Victoria has a range of committed, anticipated and potential projects in the Gippsland and Otway basins to provide additional gas supply to Victorians over the next five years. For example, the expansion of the Iona underground gas storage capacity, the Golden Beach Energy Storage Project and the Kipper field expansion are key projects underway to supply Victorians with a reliable source of energy. Further, the Victorian Gas Program completed in 2020 showed that there is a likelihood of new gas deposits yet to be discovered.

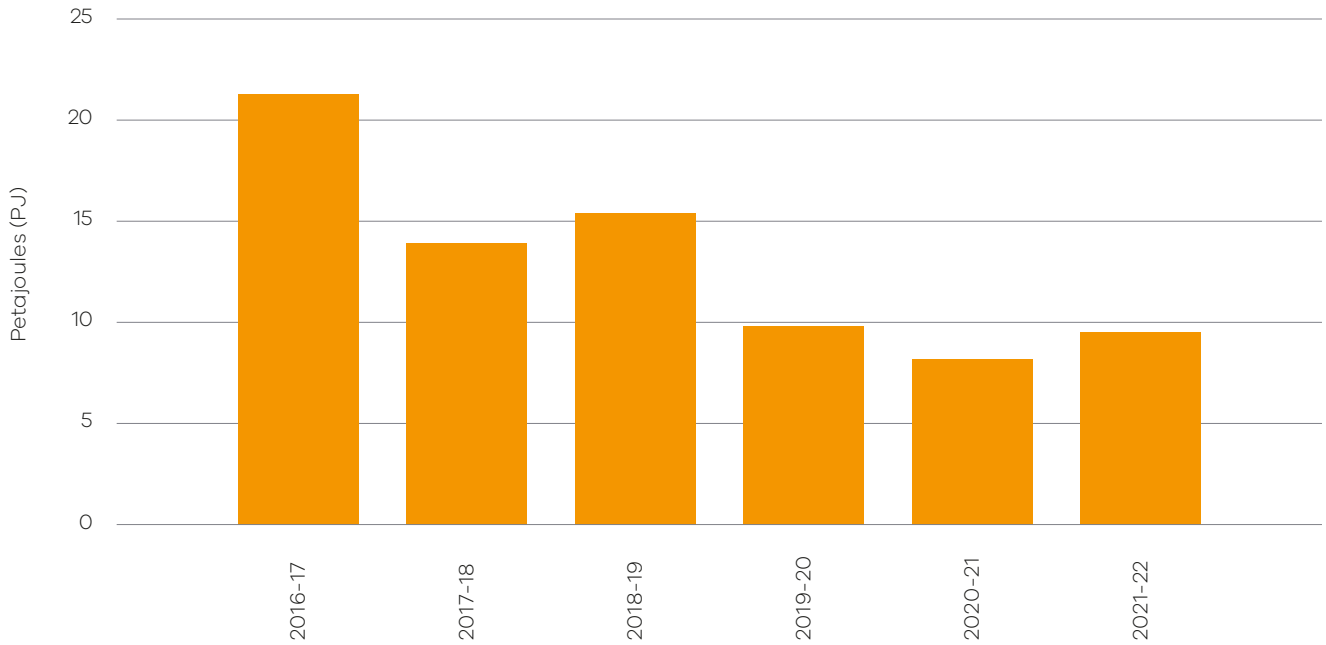
International energy commodity prices reached record high levels during 2022. The Australian Energy Regulator reported that average gas market price in Victoria was $14.60 per gigajoule (GJ) in 2021-22, up 155.7 per cent from 2020-21 levels.[31] In late-2022, the Commonwealth Government announced a temporary price cap of $12/GJ for new domestic wholesale gas contracts by east coast producers for gas which intended to minimise impacts of the energy price surge that occurred during the 2022 calendar year.

Table 6: Gas production[32]

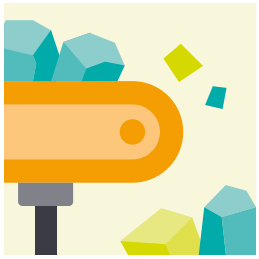
	Unit	2020-21	2021-22	Change (%)
Gas	Petajoules (PJ)	8.17	9.50	+ 16.3

26 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 5.
27 Australian Energy Market Operator, VGPR 2022, p. 18.
28 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 29.
29 Australian Energy Market Operator, Victorian Gas Planning Report (VGPR) 2022, p. 19 and VGPR 2023, p. 7.
30 Australian Energy Market Operator, Gas Statement of Opportunities 2023, p. 4.
31 Australian Energy Regulator, Gas market prices, released 01/07/2023.
32 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 29. Note: Gas production data only includes gas sourced from Victorian jurisdiction coastal waters. Around 95 per cent of gas processed in Victoria is produced in Commonwealth jurisdiction waters.

Figure 8: Gas production (petajoules)[33]



33 Earth Resources Regulation, 2016-17 to 2021-22 Annual Statistical Reports.



Extractives

69.91 million tonnes

Production volume

$1.16 billion

Production sales value

Extractive resources production volume and sales value increased year-on-year in 2021-22 (Table 7).

- Extractives production volume increased by 4.7 per cent – from 66.78 million tonnes in 2020-21 to 69.91 million tonnes in 2021-22.[34]
- Extractives sales value increased 4 per cent – from $1.11 billion in 2020-21 to $1.16 billion in 2021-22.
- 15 new extractive work authorities were granted in 2021-22 with a total estimated resource available for extraction of $56.1 million.

Victoria's extractives sector has seen consistent growth since 2015 (Figure 9), with key government initiatives such as the 'Big Build' program driving demand for extractives and creating jobs within key regions across the state. As of 30 June 2022, there were 847 quarries holding current extractive industries work authorities under the Mineral Resources Sustainable Development Act. In 2021-22, the top six extractive resource producing Local Government Areas (by volume) were Cardinia, Wyndham, South Gippsland, Greater Geelong, Whittlesea, and Melton, together representing more than 40 per cent of Victoria's total extractive resources production.[35]

34 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 6.
35 Earth Resources Regulation, unpublished data.

Figure 9: Production and value of sales by financial year[36]

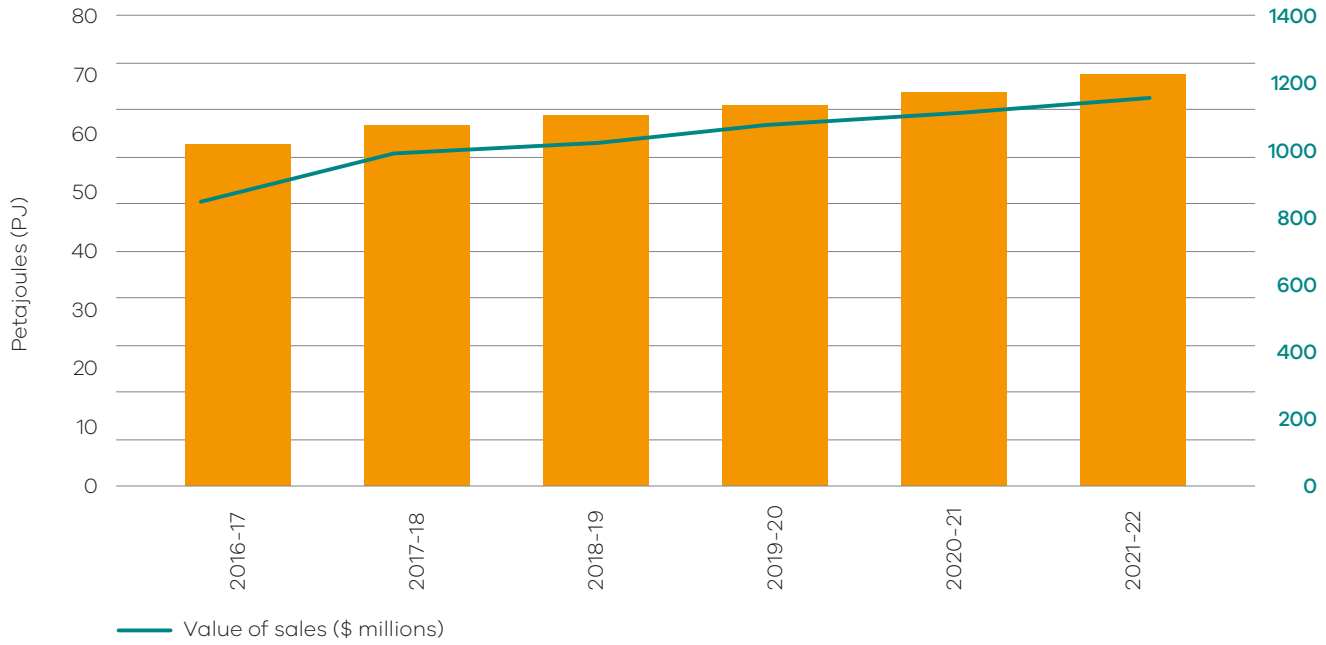


Table 7: Extractives volume and value of production[37]

Product Group	Product Type	2020-21 Sales Volume (thousand tonnes)	2021-22 Sales Volume (thousand tonnes)	Change (%)	2020-21 Sales Value ($ million)	2021-22 Sales Value ($ million)	Change (%)
Hard rock	Basalt	25,540	27,870	9.1	444.5	474.6	6.8
	Dolerite	350	0	-100.0	6.7	0.0	-100.0
	Gneiss	-	-	-	0.0	0.0	N/A
	Granite	7,380	6,650	-9.9	138.8	134.0	-3.5
	Hornfels	5,580	7,260	30.1	111.4	141.1	26.7
	Quartzite	40	80	100.0	1.1	1.5	42.5
	Rhyodacite	1,730	2,160	24.9	40.0	51.3	28.3
	Schist	190	430	126.3	4.5	9.7	113.9
	Slate	230	60	-73.9	1.5	1.0	-34.9
	Trachyte	20	30	50.0	0.5	0.6	18.5
Sub-total		40,870	44,540	9.0	748.9	813.8	8.7
Soft rock	Clay & clay shale	1,300	2,740	110.8	3.3	4.4	32.6
	Limestone	2,270	2,020	-11.0	38.5	35.9	-6.8
	Sand & gravel	17,110	16,480	-3.7	262.1	247.4	-5.6
	Scoria	1,120	950	-15.2	18.8	18.4	-2.1
	Sedimentary	3,570	2,750	-23.0	37.5	33.8	-9.9
	Soil	150	180	20.0	1.1	1.1	4.6
	Tuff	200	240	20.0	2.3	2.3	2.2
Sub-total		25,720	25,360	-1.4	363.5	343.2	-5.6
Grand total		66,780	69,901	4.7	1112.4	1156.9	4.0

36 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 6.
37 Earth Resources Regulation, 2021-22 Annual Statistical Report, p. 8.

Extractives Demand and Supply

$40.6 billion

Demand (value of building work done)

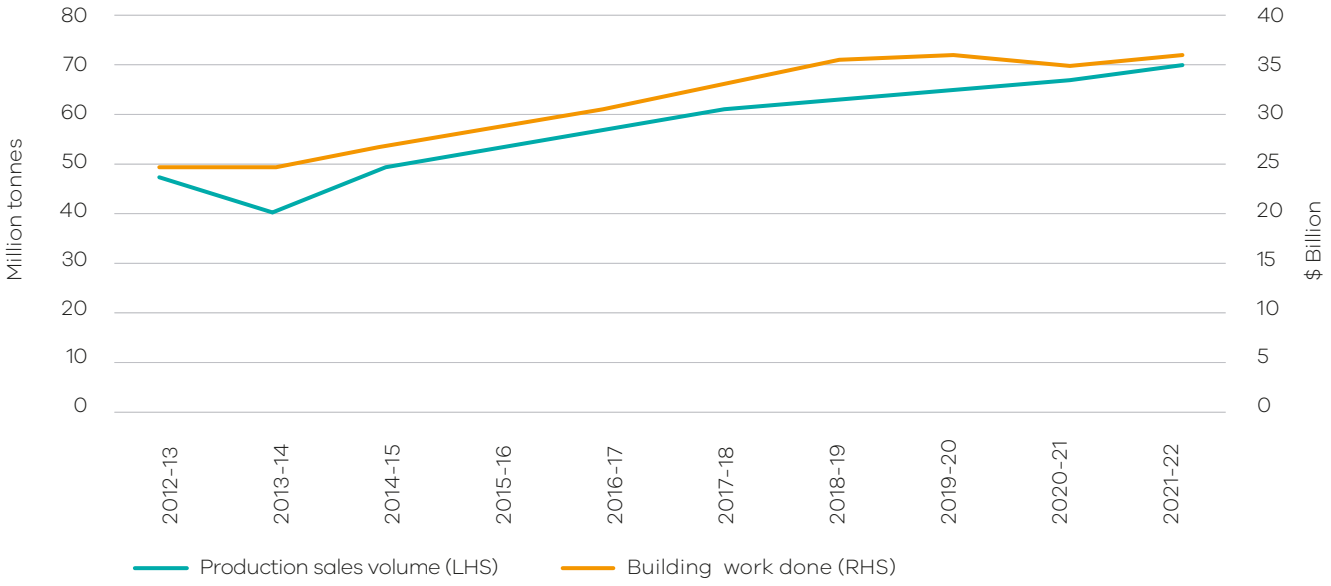
69.91 (million tonnes)

Supply (total resource produced/production sales volume)

In 2021-22, the value of building work undertaken in Victoria recorded $40.6 billion, a 2.8 per cent decrease in 2020-21 values. Building work bounced back after a slow year recorded in 2020-21, largely tied to issues related to the COVID-19 pandemic (Figure 10), however growing at a slower rate than recorded between 2014 and 2019 where average annual growth rates were 7.5 per cent.[38] [39] The value for residential construction projects increased by 0.4 per cent year-on-year, compared to a 7 per cent increase in value of non-residential projects year-on-year.[40]

Despite a lower value recorded of building work undertaken, the volume of extractives produced continues to reach its highest level over the past decade, recording almost 70 million tonnes in 2021-22. The continued supply of extractives highlights the continued growth of construction activity, as demand for extractive resources is primarily driven by the construction sector. While industry is doing its part to boost supply to meet demand, there are signs that over the medium term the supply demand outlook for the sector will tighten.

Figure 10: Extractive resources demand and supply[41] [42]



38 Australia Bureau of Statistics, 8755.0, Construction Work Done, released 30/08/2023.
39 Note: Both residential and non-residential construction projects are included in this measure.
40 Australia Bureau of Statistics, 8755.0, Construction Work Done, released 30/08/2023.
41 Earth Resources Regulation, Statistical Reports, 2012-2022.
42 Australia Bureau of Statistics, 8755.0, Construction Work Done, released 30/08/2023.

Employment

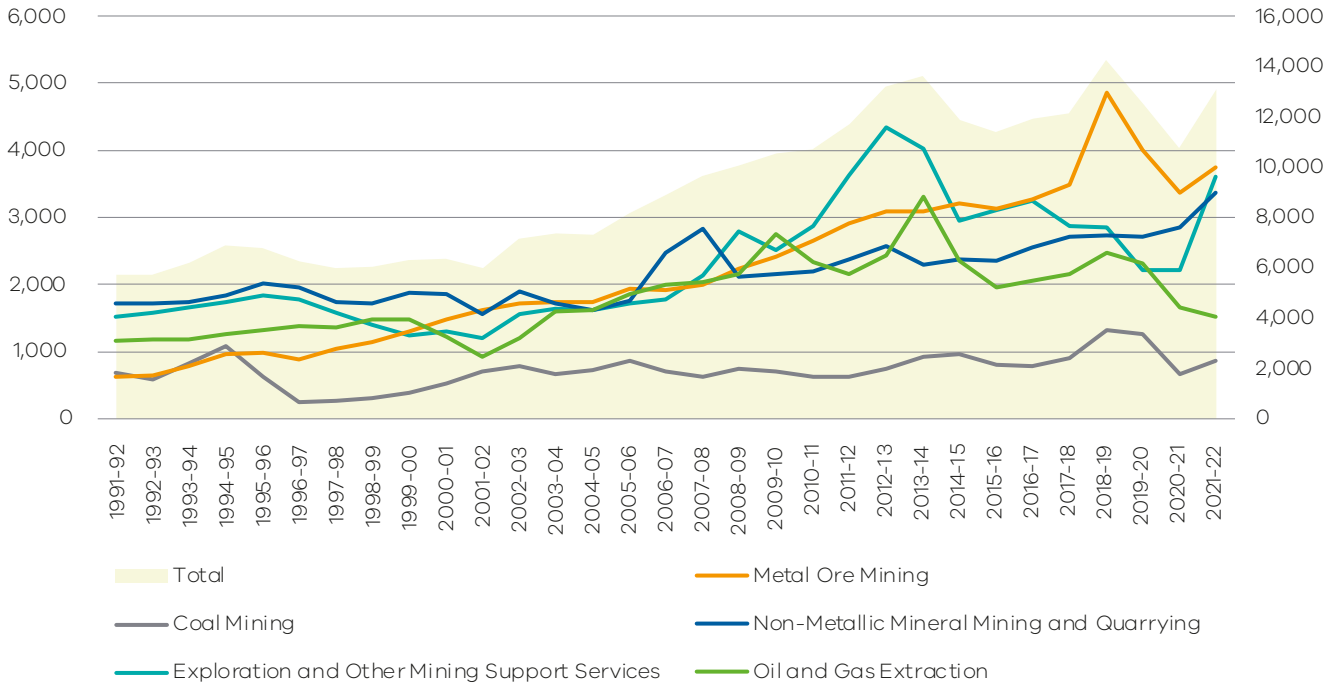
Due to the economic disruptions caused by the COVID-19 pandemic, both the 2019-20 and 2020-21 financial years experienced notable employment volatility across the economy. Employment numbers have largely recovered over the 2021-22 financial year, as the labour market increasingly tightens due to a range of factors.

Data from the National Institute of Economic and Industry Research, which specifically looks at the mining sector and sub-sectors within the state, recorded an increase in employment in the Victorian mining sector. The sector experiences a near 22 per cent increase during the 2021-22 financial year to reach 13,107 persons employed.[43] Around 82 per cent of these jobs are located outside of the Melbourne metropolitan area.

Employment within the Victorian mining sector has grown since the 1990s but has levelled off over the past decade (Figure 11). Between 1991 and 2012, number of persons employed grew 130 per cent from 5,738 persons employed to 13,188. Since 2012, employment has grown at only 2 per cent on average per annum.[44]

Average productivity per worker in the mining sector has been consistently higher compared to other sectors in the economy. In 2022, output per worker was estimated at $1.4 million, significantly higher than the state average of $324,738, highlighting the high marginal economic value produced by mining in the economy.[45]

Figure 11: Number of employed persons in Mining industry and sub-sectors (1991-2022)46



43 National Institute of Economic and Industry Research (NIEIR) employment data provided to the Department of Jobs, Skills, Industry and Regions.
44 NIEIR employment data provided to the Department of Jobs, Skills, Industry and Regions.
45 REMPLAN Economy – Employment reports, informed by ABS Census data.
46 NIEIR employment data provided to the Department of Jobs, Skills, Industry and Regions.

Overview of Victoria's Resources

Minerals

The minerals sector in Victoria comprises the exploration, mining and processing of gold and other metals, heavy mineral sands, and coal.

Gold

Victoria is a world-renowned gold province and its history is closely connected to gold mining when gold was first discovered near Ballarat in 1851. Recently, a "second gold rush" is now underway with major mining companies setting up operations in Victoria, with production currently in the order of approximately 650,000 ounces of gold per annum, coming mainly from the world-class Fosterville deposit, Ballarat, Costerfield and Stawell.

Many Victorian goldfields offer opportunities for new discoveries through the application of modern geoscience knowledge and minerals exploration techniques and technology. The Geological Survey of Victoria has undertaken pre-competitive geoscience that demonstrates rocks prospective for gold extend north from well-known areas at Stawell and Bendigo under the plains of north central Victoria. This is a current focus of mineral exploration by industry. In 2021, the Victorian Government announced two winning tenderers for four exploration blocks of highly prospective land around this area in north-central Victoria.

Gold is an investment asset for governments, central banks and private investors. Gold has strong conductivity properties and as a result has a large demand for use in electronics and computers and is also common in jewellery, decorative items and some coins.

Base metals

Base metal prospects and deposits across Victoria that include copper, lead, zinc, antimony, molybdenum, tin, tungsten and nickel. Victoria's geology is favourable in parts for base metals, with known prospects and deposits of molybdenum and lead-zinc in the state's east and a new high-grade copper discovery in the west.

Antimony

Historically and economically, antimony is the second most important metallic commodity in Victoria, after gold. The main use of antimony is to harden lead in storage batteries, and it is increasingly being used in the semiconductor industry. It is also used in electronic screen manufacturing and features highly on the critical minerals list of many countries including Australia, the US, Canada, Japan, and the European Union.47 A significant antimony resource is located at Costerfield and there has been important historical production from the Ringwood and Coimadai deposits.

Heavy mineral sands (and rare earth elements)

Victoria has known mineral sands deposits including zircon, titanium minerals (rutile, ilmenite, leucoxene), monazite, and xenotime, critical commodities in Australia's list of critical minerals.48 Mineral sands activity is focused around the Murray Basin in the state's west, with deposits also identified in south eastern Victoria. Mineral sands deposits also have the potential to contain rare earth elements, that are inputs to low carbon technologies. Several companies are exploring for mineral sands in Victoria. The Murray, Gippsland, and Otway basins provide further exploration opportunities.

Victoria has the potential to supply critical commodities contained within heavy mineral sands for modern industry. As governments globally promote low carbon economies along with advancements in new high-technology products, the demand for rare earth elements is set to increase. The strategic importance of rare earth elements signals potential economic opportunities for regional Victoria in the future.

47 Australian Government, Geoscience Australia, Antimony, accessed 21/09/2023.
48 Australian Government, Department of Industry, Science and Resources, Australia's Critical Minerals List, accessed 21/09/2023.

Coal

Brown coal has been an important economic resource for Victoria. Historically, demand for brown coal has been driven by Victoria's electricity needs, which have been met from coal-fired generators located in the Latrobe Valley. More than 80 per cent of Victoria's brown coal (also called lignite) is located in the Gippsland Basin, off the South-East coast of Victoria. By world standards, Victoria's brown coal has relatively low impurities as it is typically low in ash, sulphur, heavy metals and nitrogen.

While brown coal-fired power generation supplies the majority of Victoria's electricity today, its share of generation will reduce over the coming decades with the retirement of existing generators, market conditions and the need to respond to climate change.

One of the major projects underway in Victoria is the Hydrogen Energy Supply Chain (HESC) Project – a world-first pilot project to safely and efficiently produce and transport clean hydrogen from Victoria's Latrobe Valley to Japan. The project recently entered the commercial demonstration phase with the commitment of approximately $2.35 billion in funding from the Japanese Government.49

The Victorian Government's CarbonNet Project is establishing a commercial-scale carbon capture and storage (CCS) network hub in Gippsland, that may be operational by 2027. CarbonNet is a critical enabler for new industries such as clean hydrogen and fertiliser production, decarbonising industry, with potential for negative emissions through biomass. Both CarbonNet and HESC are paramount in delivering world class carbon storage opportunities and enabling the use of coal in Victoria's net zero carbon future.

The Latrobe Valley Coal Mines and adjoining power stations have all announced closer dates with Energy Australia announcing it will cease electricity production at Yallourn Mine in 2028 and AGL recently announcing that the Loy Yang A power station will close in 2035. The Loy Yang mine feeds both the Loy Yang A and Loy Yang B Power Stations and is licensed to continue production to 2048. The Hazelwood Brown Coal Mine is already undergoing its post-closure work. Closure planning, studies and works will continue, consistent with regulations and government policy including the Latrobe Valley Regional Rehabilitation Strategy.

Other minerals

Interest in exploration for lithium has grown in response to demand for its use in batteries for electric cars and for several other key automotive components. Aluminium–lithium alloys also have important uses in aerospace technology. Certain lithium deposits may be present in Victoria. The Lake Boga granite may be prospective for lithium-bearing minerals.

Geological Survey of Victoria has been working alongside industry to better understand the potential for lithium in Victoria. Recently, Dart Mining identified lithium bearing pegmatites in northeast Victoria, about 40 to 80 km southeast of Wodonga. The lithium bearing pegmatites in this this area are about 420 million years old and formed when Victoria was part of the supercontinent Gondwana.

49 Hydrogen Energy Supply Chain Project, Japan commits AUD$2.35 billion to establish world's first liquefied hydrogen supply chain, released 07/03/2023.

Extractives

Victoria is endowed with a range of extractive resources, including basalt, hornfels, granite and sand. Extractives are key inputs to vital construction products such as concrete, cement, bricks and road paving.

Residential and commercial development along with transport and energy infrastructure, are all key drivers for extractive material demand. Victoria is growing quickly with demand for extractives (quarry materials) is set to double between 2015 and 2050.

Demand for extractives products is being driven to unprecedented levels, as a result of Victoria's 'Big Build.' The 'Big Build' is delivering $90 billion of transport projects, including 165 major road and rail projects and increasing construction of residential, commercial and renewable energy infrastructure by the private sector.

Hard rock

Hard rock production in Victoria is comprised primarily of basalt, granite and hornfels. Hard rock is typically used in the construction industry for road surfacing, building blocks or in groundwork. Critical suppliers of hard rock are located across the state including South Gippsland, Mitchell and Wyndham, where most of the basalt for the Melbourne supply area is sourced from.

Soft rock

Sand is typically used in glass (sand) and cement manufacturing, and construction services. Sand and gravel production is concentrated in similar areas of the state to hard rock, with South Gippsland identified as a key supplier of sand and gravel resources to Greater Melbourne, along with other southeast Victoria locations including Cardinia and Baw Baw.

Gas

Victoria is the largest user of fossil gas in Australia, with two million households and businesses connected to the reticulated gas network s for heating, cooking and hot water services.

Currently, most of Victoria's gas demand is met from offshore gas reserves in Commonwealth jurisdiction waters in the Bass Strait. Mature projects include the Bass Strait gas fields, predominantly produced by Esso since the 1960s. In the last few years, Esso has taken steps to increase production from the Kipper, Tuna and West Barracouta gas fields and is intending to expand production from the Turrum gas field.

Other companies are also producing gas in Bass Strait and supplying it to gas plants in Gippsland. Elsewhere in Gippsland, gas has been discovered and the lease holders are investigating means to make the developments commercially viable to bring gas to Victorian customers.

Mature offshore projects in Victoria's west are supplying gas to two gas plants in the Otway region. In the last few years, Beach Energy has taken steps to increase production from the offshore Geographe and Thylacine gas fields and commence production from the Enterprise gas field.

Mature onshore projects in Victoria's west primarily involve storing gas underground in depleted gas fields.

The only gas production occurring in Victorian jurisdiction coastal waters is from the Halladale and Speculant Project, about 30 kilometres east of Warrnambool. The operation is using a land base (under a Special Drilling Authorisation for the well-head site onshore) to access reservoirs five kilometres off the coast in the Otway Basin.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