



EARTH RESOURCES SECTOR INDICATORS 2019–2020

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Page 6 image courtesy of Kirkland Lake Gold's Fosterville Gold Mine







MINISTER'S FOREWORD



In the midst of a global pandemic, Victoria has record quarry production and minerals exploration expenditure growth. In the financial year 2019-20, Victoria also had the highest gold production in over 100 years.

Our resources sector remains strong and the outlook is overwhelmingly positive.

This government's policies and programs are delivering results, with record-high infrastructure investment stimulating demand for raw materials from our quarrying sector.

An expanding resources sector is a crucial part of the government's approach to delivering investment opportunities and well-paid local jobs in regional Victoria.

To be able to tell the story of the important role the sector plays it is vital that we have access to the latest, most reliable data.

The 2019-20 Earth Resources Sector Indicators report, produced by the Department of Jobs, Precincts and Regions, highlights several positive trends.

Quarry production has grown by 25 per cent over the last six years, and provided over 63 million tonnes of sand, rock and gravel last financial year to help deliver new housing and infrastructure development.

The impact of the coronavirus pandemic can be seen towards the end of the 2019-20 financial year and recovery will remain a challenge.

The sector remains resilient and my government will continue to support the resources sector for the benefit of all Victorians.

Year-on-year, gold production is up almost 40 per cent. Minerals exploration expenditure, a measure of industry confidence and a precursor to future mining investment, remains at a record high, increasing 33 per cent from 2018-19.

In response to the number of minerals licence applications received, the government has provided additional funds to ensure approvals processing can continue at pace, while ensuring adequate safeguards are in place. This will help keep the momentum going and ensure works can be ramped up to assist the state's economic recovery.

I'm proud that the Victorian Government continues to invest in programs across the resources portfolio and would like to thank everyone across the resources sector for a year of hard work during a difficult period.

I look forward to highlighting the important work that is being delivered in future editions of this report.

A handwritten signature in blue ink, reading 'Jaclyn Symes'.

Jaclyn Symes MP
Minister for Resources



INTRODUCTION

Each year, the *Earth Resources Sector Indicators* report is produced to promote a shared understanding of the sector and enable effective earth resource decision-making.

This report includes mineral and extractive resources information for the 2019–20 financial year and builds on foundations laid by previous Earth Resources Sector Indicators reports.

Earth Resources Sector Indicators is intended to:

- establish a framework for collection and analysis of key information for the sector;
- 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 reports.

VICTORIAN GOVERNMENT POLICY

Gas

The government is committed to ensuring long-term, affordable gas supplies are available to Victorian homes and businesses.

- In 2020, the Victorian Gas Program's three-year suite of scientific studies concluded in relation to the potential for new discoveries of onshore conventional gas and the risks, benefits and impacts of developing the resource. The studies found that an onshore conventional gas industry would not compromise the state's environmental and agriculture credentials. The VGP's modelling estimated that there could be 128–830 petajoules of onshore conventional gas in the Otway and Gippsland basins.
- In June 2020, the Parliament passed the *Petroleum Legislation Amendment Act 2020* to allow for an orderly restart of onshore conventional gas exploration and production from 1 July 2021 with new requirements to enhance community confidence in the industry. The amendment ends a series of moratoriums on onshore conventional gas that have been in place since 2012. The restart of the industry has the potential to generate about \$300 million annually for regional economies and create up to 6,400 jobs over the lifespan of these projects. Developing the gas would supplement Victoria's domestic supplies and support approximately two million domestic and industrial users.¹ In June 2020, EnergyQuest reported that the onshore conventional gas identified by the Victorian Gas Program, while modest, could be beneficial for industrial gas users.²
- The department has been engaging with industry and peak bodies to develop new regulations to support the *Petroleum Act 1998* and the reforms arising from the *Petroleum Legislation Amendment Act 2020*. The public will have an opportunity to comment on the proposed regulations that will define new standards in industry transparency and community engagement as part of the restart of the industry.
- To encourage further offshore gas exploration and development, government released five offshore acreage areas in the Otway Basin for tender in 2018, and released data from an airborne gravity survey of a large portion of the basin. In July 2020, the Minister for Resources announced that two exploration permits from this tender process were granted to Beach Energy and Bridgeport Energy. Should initial exploration be successful, up to \$85 million could flow into the economy, contributing to further investment in South-West Victoria and new jobs.
- All new gas from offshore waters under Victorian jurisdiction and onshore conventional gas development will be prioritised for domestic use, further strengthening Victoria's energy security and supporting local industry and consumers. Natural gas will continue to play an important role in supporting Victoria's transition to a cleaner energy future, in line with the government's commitment to net-zero emissions by 2050.
- In March 2021, the Victorian Government enshrined in the Victorian Constitution a permanent ban on hydraulic fracturing (fracking) and exploration for mining of coal seam gas.
- The Victorian Budget 2020/21 provided \$5 million over two years to develop, implement and enforce a new regulatory regime to facilitate the orderly restart of the onshore conventional gas industry. The government will work with industry and communities to develop rigorous engagement and transparency obligations and improve the regulatory framework to guarantee a world's best practice approach.

1 Victorian Gas Program, Progress Report No 5, December 2020.

2 EnergyQuest, *EnergyQuarterly*, June 2020

Minerals

The Victorian Government is progressing actions outlined in the *State of Discovery: Mineral Resources Strategy 2018-23 (2018)* to help grow investment and jobs in Victoria's minerals sector.

- In October 2019, the Victorian Government announced a competitive tender for mineral exploration rights in the North Central Victorian Goldfields area, which is prospective for gold. The North Central Victorian Goldfields area neighbours the Fosterville Gold Mine near Bendigo, an internationally-renowned success story with some of the highest gold grades and lowest cost of production reported globally in recent years. This tender raises the bar significantly for engagement of Traditional Owners in mineral exploration, as well as engagement with landholders and local communities.
 - Stakeholder engagement around the North Central Goldfields ground release is ongoing. The department has held initial briefings with local councils, agencies, water authorities and Traditional Owner groups. Three online community information sessions took place in February and March 2020 to provide information about the tender and the region's prospectivity.
- In support of the broader Mining Equipment, Technology and Services (METS) sector the Department of Jobs, Precincts and Regions (DJPR) launched the METS Regional Innovation Accelerator Program in October 2019. The program is designed to help regionally based businesses to engage with local mining companies, fast-track product innovation and promote their services.
 - In 2021, the METS Export Hub was launched with Austmine and Commonwealth funding. The Victoria METS Export Hub will form networks of METS companies and through providing linkages, connections, training and global market identification, will capitalise on existing strengths to build export opportunities for Victorian METS.
- The Prospects Partnership between DJPR and the Australasian Institute of Mining and Metallurgy (AusIMM) is a commitment under State of Discovery, Victoria's Minerals Resources Strategy. This partnership seeks to attract skilled workers to the resources sector and increase diversity. In February 2020, Minister for Resources Jaclyn Symes congratulated three recipients on being accepted in the second round of the Women on Boards scholarship program under the partnership. The Women on Boards program aims to increase the number of women with Science, Technology, Engineering and Mathematics (STEM) knowledge sitting on resources boards. Research shows diverse boards result in better outcomes and greater innovation. While the number of women on boards within the resources sector is increasing, women with technical industry skills remain under-represented.
- Earth Resources Regulation has undertaken significant reforms, implementing recommendations from the Commissioner for *Better Regulation's Getting the Groundwork Right: Implementation Plan (2017)*.
- On 1 January 2020, the Victorian Government removed the exemption on gold from the Victorian royalty regime. The gold royalty rate is set at 2.75 per cent of the net market value of production, consistent with the royalty rate for other minerals. The royalty includes a low-production threshold and does not apply to the first 2,500 ounces of gold produced per annum. In 2019-20 there were 22 mining licences and only five were liable for royalty payments. The gold royalty revenue will assist in delivering a variety of government priorities and will fund government initiatives that support economic recovery.
- The Stavely Ground Release 2018 and the North Central Victorian Goldfields Ground Release 2020 will contribute to the growth of Victoria's mineral exploration over the next few years. The release of new areas for exploration is likely to provide investors with new exploration and discovery opportunities that may one day become new operations.

Extractives

***Victoria's Helping Victoria Grow: Extractive Resources Strategy (2018)* sets out the government's proactive plan to ensure that a reliable and affordable supply of extractive resources continues to be available to support Victoria's growth.**

The Extractives Strategy Taskforce, which includes representatives from industry and across government, continues to monitor the extractive resources demand and supply situation closely.

Extractive resources and the quarrying sector are the foundation of our built environment and linear infrastructure, contributing to Victoria's economic development, liveability and community wellbeing:

- Many of Victoria's quarries are in regional and peri-urban areas and can generate significant benefits for host communities and the broader region when planned for and operated responsibly. They are the backbone of many regional towns, providing employment and downstream economic benefits to those communities.
- The Victorian Government has implemented regulatory improvements to ensure that decisions about new and expanded quarries are accelerated, including providing guidance to help industry navigate approval processes.
- The Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019 were remade and the updated regulations came into effect in January 2020. The remade regulations support the regulator and industry to better manage the risks associated with quarrying (including site rehabilitation) and introduced requirements to better capture data on reserve levels of sand and stone throughout Victoria. Government, community and industry all benefit from access to data to inform decision-making on infrastructure, transport, logistics, and construction.
 - In March 2021, the Preparation of Rehabilitation Plans – Guideline for Extractive Industry Projects was released. It provides industry with information to assist in developing rehabilitation plans that meet new regulatory requirements that commence on 1 July 2021. Completion of the guideline was also an action responding to the VAGO recommendations on Rehabilitating Mines.
- The Strategic Extractive Resource Areas (SERA) Pilot Project is scheduled to be delivered in 2021. The SERA Pilot Project will trial the application of new provisions in the planning scheme to better identify potential extractive resources and protect them from encroachment by incompatible land uses. The pilots are being conducted within the Wyndham and South Gippsland local government areas. DJPR is partnering with the Department of Environment, Land, Water and Planning to deliver this project, in collaboration with the two councils.
- In 2018, the Resources and Planning Ministers released a joint Ministerial Statement (the Statement) to deliver a better approach for land use planning and regulation that will secure the quarries we need for the growth of the state. The Statement included a 'hot list' of 11 existing quarries earmarked for new, streamlined approval processes and land use planning reforms for extractives. The hot list was renamed the Extractive Industry Priority Project List in July 2020. As at June 2021, 12 listed applications have been approved, and there are 10 eligible applications in the updated list. The updated list is now published on the DJPR earth resources website.
- The Victorian Government is investing \$19.6 billion per year between 2020/21 and 2023/24, or around \$80 billion in total capital spend over that period. Continued supply of extractive materials is vital to support the government's infrastructure investment as we recover from the coronavirus (COVID-19) pandemic.
- Longer term infrastructure projects include \$70 billion of work already underway on road and rail projects such as the Metro Tunnel, level crossing removals, the North-East Link and \$2.7 billion on the Building Works package towards shovel-ready projects in response to the coronavirus (COVID-19) pandemic.

- The 2020-2021 Budget allocated funds to capital projects with a total estimated investment of up to \$19.8 billion, creating the largest capital program in our state's history, requiring extractives material. This includes:
 - \$5.3 billion for the Big Housing Build to construct more than 12,000 new social housing dwellings and create 10,000 jobs per year for the next four years.
 - \$532 million has been allocated to six fast-start projects across greater Melbourne which will build more than 1,000 new homes.
 - On top of the fast-start projects, the government will also invest \$948 million to spot-purchase properties and buy new homes in construction projects that are either in progress or ready to build. This investment will secure 1,600 social housing properties and 200 affordable homes – bolstering the construction industry.
 - \$3.8 billion to maintain and support our regional rail network;
 - \$2 billion to build new hospitals and upgrading existing ones;
 - \$1.9 billion to upgrade 162 schools, build one new school and four additional stages at recently built schools;
 - \$450 million for a statewide road maintenance blitz to improve safety for all road users and help maximise the productivity of the Victorian road network; and
 - \$120 million top up for the Regional Health Infrastructure Fund.



Carbon Capture and Storage

Following the release of the *Statement on Future Uses of Brown Coal (2017)*, the Victorian Government is continuing to investigate carbon abatement strategies including Carbon Capture and Storage (CCS):

- CarbonNet is advancing its work to test the viability of establishing a commercial-scale CCS network hub in Gippsland, using world class offshore storage sites in Bass Strait.
- CarbonNet is a critical enabler for the commercial stage of the Japanese led Hydrogen Energy Supply Chain (HESC) Project. The HESC Pilot Project is a world first looking to prove and commercialise a supply chain between Australia in the Latrobe Valley and Japan for hydrogen produced from brown coal.
- The HESC Pilot Project commenced operations for one year in 2020, with a view to a commercial project operating in the 2030s, based on the availability of a viable CCS solution.
- The HESC Pilot Project will see \$230 million expended in Victoria and will create approximately 400 jobs directly and in the supply chain.
- If proved viable, HESC and CarbonNet could present Victoria with an option to secure jobs, boost skills and attract investment in new industries, while strengthening Victoria's energy security, climate change leadership and energy export options.
- CarbonNet has safely and successfully completed its field activities at the Pelican site in Bass Strait, a marine seismic survey in 2018 and an offshore appraisal well in 2019/20.
 - The data obtained validated that Pelican is a safe and secure site for permanent CO² storage.
 - All field activities involved stakeholder engagement and strict regulatory and environmental approvals through state and federal regulators.

Mine Rehabilitation

The Latrobe Valley Regional Rehabilitation Strategy (LVRRS) was released in June 2020 and provides a blueprint to progress Latrobe Valley coal mine rehabilitation planning and activities to achieve safe, stable and sustainable landforms that support the next land use. The LVRRS builds on legislative reforms introduced in 2019 to strengthen rehabilitation planning requirements. The implementation of the LVRRS will provide mine licensees with further clarity on the options available for mine rehabilitation. This will include exploring the feasibility of alternative water sources and guidance on how to assess the future water availability from the Latrobe River system.

The Mine Land Rehabilitation Authority was established from 30 June 2020 to monitor the implementation of the LVRRS and provide assurance that government and industry are progressing mine rehabilitation planning.

The department is preparing to amend regulations to give effect to the legislative reforms introduced in 2019. The Declared Mine Regulations are due to be released for public consultation in 2021.

Community

- The Minister for Resources launched *A Guide to Recreational Prospecting in Victoria* in March 2021. The new guide produced by Earth Resources Regulation explains where prospecting can take place, what equipment can be used and the importance of respecting Aboriginal and other cultural heritage.
- The department opened the second round of its pilot community advisor grants program in March. The program seeks to enable local community groups to access legal expertise to help them understand and contribute to relevant Environment Effects Statement (EES) processes.

- The first round was opened in 2019 for the Fingerboards Mineral Sands proposal EES and is now closed. Mine-free Glenaladale was awarded \$40,000 to engage legal services to assist in making a submission to the EES process. The second round of grant funding is for the Bunyip North Granite Quarry proposal. Two grants of up to \$40,000 each are available.
- The land access consent tool (launched in 2019) provides new support for landholders. The department has developed a simple, voluntary land access consent and compensation agreement template, the *Commercial Consent Agreement for Access to Private Land in Victoria* (the Agreement) which can be tailored to the needs of individual parties.
 - The Agreement includes special conditions for an explorer to follow when carrying out exploration work on private property. These conditions align with the Mineral Resources (Sustainable Development) Act 1990, the Code of Practice for Mineral Exploration and industry best practice.
 - This was originally a pilot project for exploration at the Stavely Ground Release in Western Victoria, but has been extended to include the North Central Goldfields Ground Release. The Agreement can also be used for exploration activities outside of these areas.

Coronavirus (COVID-19) Victorian Government Response

The information in this report on coronavirus (COVID-19) is up to date as of 30 June 2021, however the impacts and responses to the coronavirus (COVID-19) pandemic are ongoing and dynamic.

Mining is currently classed as an ‘essential service’ by the federal and state governments. While most operations were able to continue throughout 2020, the coronavirus (COVID-19) pandemic created several unprecedented challenges to the sectors such as logistical disruptions, restrictions on equipment and labour availability due to border closures and challenges to sourcing new capital.

The earth resources sector is an important source of jobs and economic activity – particularly for regional communities – and the government is committed to supporting the sector during and after the coronavirus (COVID-19) pandemic to aid in Victoria’s economic recovery:

- Earth Resources Regulation deferred the collection of rent and annual fees this year to aid the immediate cash flow of mines, quarries and exploration companies. The collection of around \$3.5 million of revenue was delayed by 6 months to January 2021.
- Mineral tenement holders were allowed to defer their annual technical reporting (required under legislation) as part of the coronavirus (COVID-19) support.
- The government will streamline planning to help grow strategically important quarries and develop new sites, to aid the flow of raw materials over the coming years. Earth Resources Regulation already has a streamlined approval pathway for minor changes to existing quarries. It will now fast-track the approval process for works to supply critical material for infrastructure projects at a time when businesses are facing additional pressure. Continued supply of extractive materials is vital to support the Victorian Government’s construction-led economic recovery from the coronavirus (COVID-19) pandemic including the \$2.7 billion Building Works package and other major infrastructure programs.
- The government is working with industry to position operators and employees to rebound post-pandemic, including by progressing the North Central Victorian Goldfields Ground Release tender and Victoria’s petroleum acreage release.
- The department will continue to consult with key stakeholders to understand the ongoing impacts of coronavirus (COVID-19) and how government can continue to support the resources sector in this context.

- The government worked closely with state and federal counterparts to manage cross-border issues, which ensured a well-informed and coordinated approach to the coronavirus (COVID-19) response.
 - The resources sector was given the green light in 2020 and all mining operations across regional Victoria and metropolitan Melbourne continued under COVIDSafe Plans. Presently, the Victorian resources sector has few restrictions in place.
 - On 11 January 2021, a permit system was established for all domestic travel into Victoria to combat the spread of coronavirus (COVID-19). To ensure that the resources sector continues to have access to highly skilled labour, resources sector specialist workers whose skills cannot be readily sourced in Victoria are eligible to apply for a Specified Worker Permit to enter Victoria.
- \$1.1 million in funding for Earth Resources Regulation to deal with the surge in mineral and exploration licence applications.
- The Victorian Government delivered the Victorian Budget 2021/22 on 20 May 2021. The Budget continues vital support for Victorian families, businesses and jobs, and kickstarts an unprecedented investment in infrastructure and services that our state will need for decades to come. This builds on the billions of dollars in support and stimulus that the government has already announced – delivering jobs for Victorians and helping to repair the damage that this once-in-a-generation pandemic has wrought.
- The Victorian Budget 2021/22 allocated funding to secure resources to assist with Victoria's economic recovery. The resources portfolio received funding of \$35.7 million over four years to:
 - ensure new quarries can be developed where resources are needed and adequate space around them is not compromised;
 - support the Geological Survey of Victoria to continue its work to attract new investment; and
 - enable further legislative and regulatory improvements across the resources sector to reinforce rehabilitation and environmental safeguards, support greater community engagement and continue efficient processing of industry applications.
- In 2020, the Victorian Government announced three rounds of the Business Support Fund totalling \$6 billion. This fund has supported a variety of resources businesses through grants, payroll tax refunds and waivers to enable businesses cashflow support. This funding also provides additional, tools and resources to help businesses adapt and prepare for reopening under COVID normal settings.
- As at 3 March 2021, 263,042 businesses accessed the fund, totalling \$2.46 billion including:
 - 106 mining sector businesses totalling \$915,000; and
 - 31,100 construction sector businesses totalling \$282 million.





MINERAL EXPLORATION ACTIVITY

Metres drilled: 388,662

Exploration expenditure: \$135.8 million

Mineral exploration activity in Victoria continued to build on last year's growth in 2019–20:

- Metres drilled increased by 11.6 per cent from 348,192 metres drilled in 2018–19 up to 388,662 in 2019–20.⁴
- Mineral exploration expenditure increased by 33 per cent – \$102.1 million in 2018–19⁵ up to \$135.8 million in 2019–20.⁶

Metres drilled for 2019–20 was at an all-time high for Victoria, which is consistent with 2019–20 being the highest recorded annual mineral exploration spend in Victoria's history.⁷

The discrete reporting of mineral exploration drilling on mining licences over five hectares was introduced in 2019–20.

Nearly all metres drilled were on exploration and mining licences (Table 1), with less metres drilled on retention licences, which reflects exploration investment in both existing operations and early stage targeting.

For the past five years Victoria's annual average growth rate has outpaced the national average growth rate in mineral exploration expenditure by a factor of three. The five-yearly average growth for Victoria is 44 per cent whilst the national growth is 12.6 per cent.⁸ This is consistent with Victoria's increasing share of Australia's total mineral exploration expenditure which over the same period has more than doubled from 2.04 per cent in 2015–16 to 4.90 per cent in 2019–20.⁹

Gold remained the primary contributor to mineral exploration investment in Victoria. In 2019–20 there was \$81.4 million in exploration expenditure for gold; a 42 per cent increase from the financial year before (Figure 2).

Table 1: Metres drilled per minerals tenement¹⁰

Tenement Type	Metres
Exploration Licences	128,778
Retention Licences	35,493
Mining Licences	224,391
Total	388,662

4 Geological Survey of Victoria. – Unpublished data.

5 Note: ABS 8412.0 June release (01/06/2021) contained a revision of historical mineral exploration expenditure data, reference data in this section has been revised accordingly.

6 ABS, 8412.0, Mineral and Petroleum Exploration, released 01/06/2021.

7 The Australian Bureau of Statistics has been recording mineral exploration expenditure in Victorian since 1988–89.

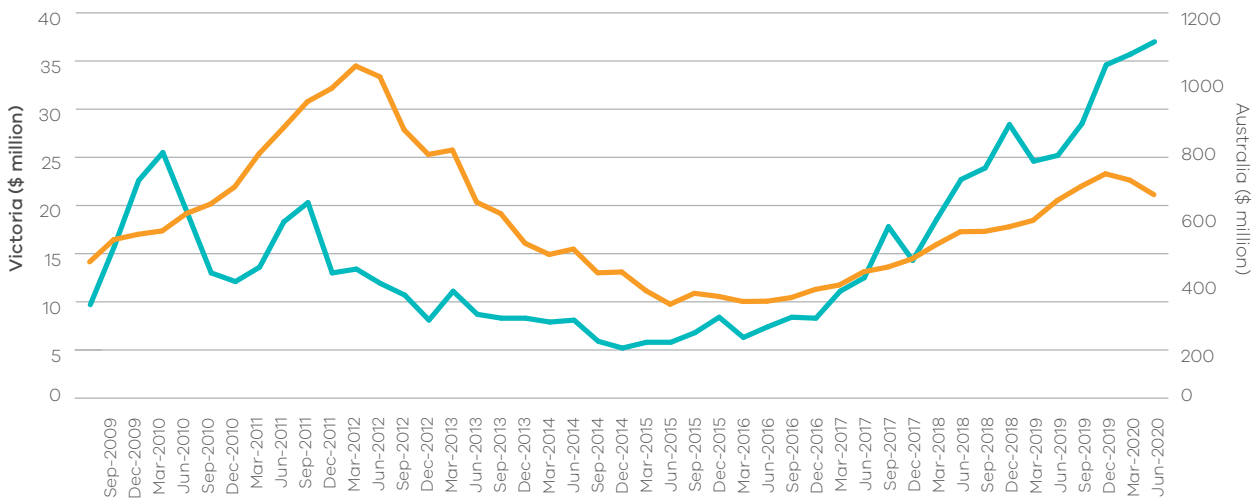
8 ABS, 8412.0, Mineral and Petroleum Exploration, released 01/06/2021.

9 ABS, 8412.0, Mineral and Petroleum Exploration, released 01/06/2021.

10 Geological Science Victoria, Unpublished Data.

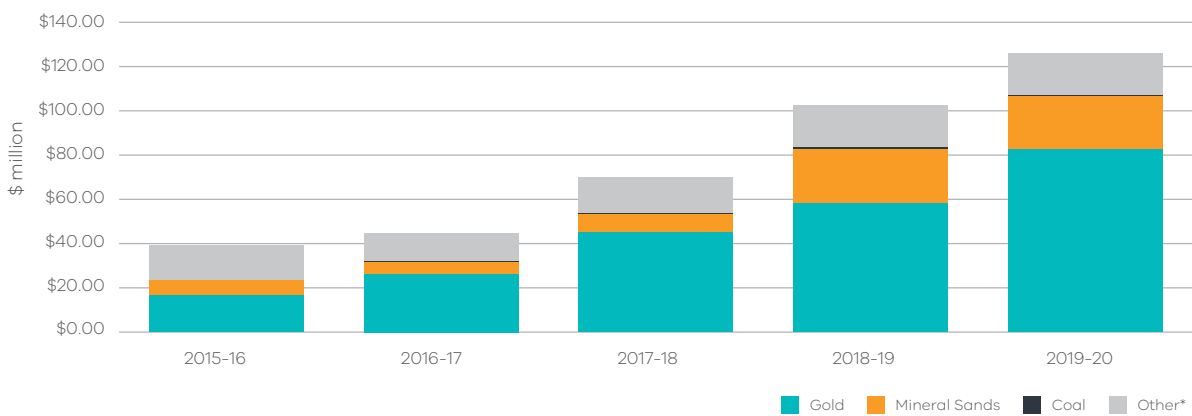


Figure 1: Mineral exploration expenditure (\$ million, seasonally adjusted)¹¹



Note: *Earth Resources Sector Indicators* only includes information on mineral exploration expenditure. Petroleum exploration data for Victoria is not reported for confidentiality reasons.

Figure 2: Mineral exploration expenditure by commodity and financial year (\$ million)¹²



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

11 ABS, 8412.0, Mineral and Petroleum Exploration, released 01/06/2021.

12 Earth Resources Regulation 2019-20 Annual Statistical Report, p.10.

The ABS reports quarterly on private mineral exploration expenditure for all Australian states and the Northern Territory (NT). Victorian mineral exploration and mining expenditure is also reported in accordance with the requirements of the MRSDA. The ABS exploration expenditure statistics can vary significantly from expenditure reported under the MRSDA. The difference between these two exploration expenditure data sets is mainly due to the difference in methodologies for data collection and the inclusion of the exploration expenditure on mining licences in the MRSDA figure. The ABS statistics are a valid basis for comparison of Victorian expenditure with other states and territories. However, the MRSDA figures provide greater detail.



LICENCES

New mineral licences granted: 47

Renewed mineral licences: 21

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

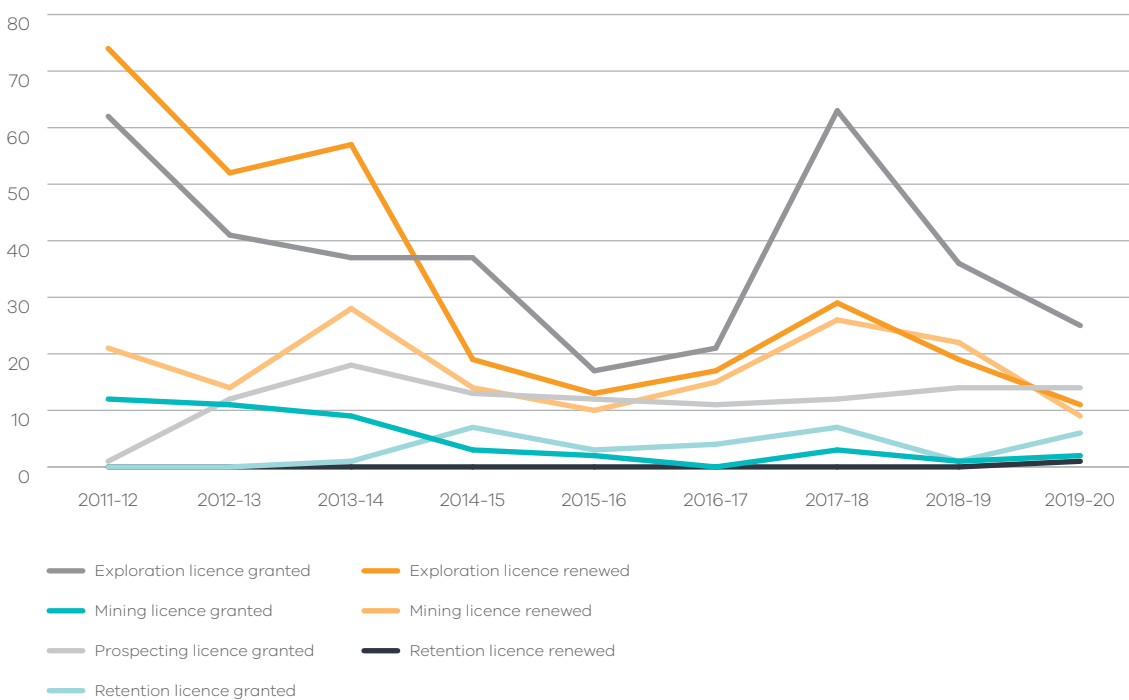
Overall, mineral licences granted and renewed decreased in 2019–20:

- New mineral licences granted decreased by 10 per cent – 52 new licences in 2018–19 down to 47 in 2019–20.
- Renewed mineral licences decreased by 49 per cent – 41 renewed licences in 2018–19 down to 21 in 2019–20.

In 2019–20, the total number of licences granted or renewed decreased compared to the previous financial year. However, the number of total active licences was at a five-year high reaching 445 total active licences (Table 2). This was supported by active exploration licences reaching a new high since 2015–16, and active licences for prospecting and retention recording a decade high (Table 2). This indicates that future mining activity is likely to remain relatively steady.

Over the same reporting period, there was a surge in mineral exploration and production interest for Victoria. Earth Resources Regulation received a total 154 applications across all licence types, a 75 per cent increase year-on-year.¹³

Figure 3: Licences granted or renewed for 2019–20¹⁴



¹³ Earth Resources Regulation, 2019–20 Annual Statistical Report, p. 15.

¹⁴ Earth Resources Regulation, 2019–20 Annual Statistical Report, p. 16.

Table 2: Current mineral tenements as at 30 June 2020¹⁵

Tenement Type	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20
Exploration Licences	271	247	211	180	200	212	217
Mining Licences	191	171	170	162	156	145	141
Prospecting Licences	31	41	51	54	59	55	60
Retention Licences	1	8	11	15	20	21	27
Totals	494	467	443	411	435	433	445
Change year-on-year (%)	-8.0	-5.5	-5.1	-7.2	+5.8	-0.5	+2.8

¹⁵ Earth Resources Regulation, 2019–20 Annual Statistical Report, p. 15.





MINER'S RIGHTS

Number of miner's rights: 8,487

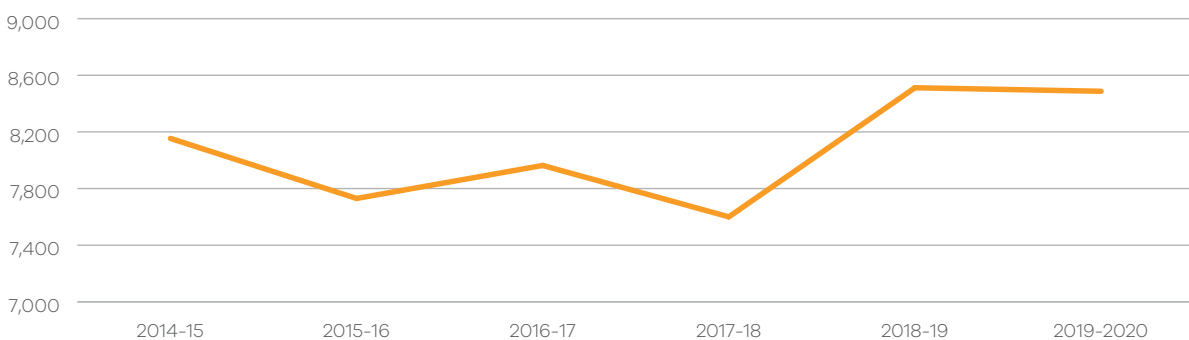
The number of new miner's rights in Victoria decreased marginally year-on-year in 2019–20.

- New miner's rights granted decreased by 0.29 per cent – 8,512 in 2018–19 down to 8,487 in 2019–20 (Figure 4).

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.

Recreational prospecting is often conducted on public land and has health and wellbeing benefits for participants. According to the Victorian Environmental Assessment Council, recreational prospectors contribute to local economies in terms of spending on consumables and accommodation, in prospecting supply shops and through participation on prospecting tours.¹⁶

Figure 4: Number of miner's rights sold¹⁷



NB: These figures that are published in each Earth Resources Sector Indicators edition may differ from year to year. On average 80 per cent of miner's rights are sold "online" and the remainder 20 per cent are sold through "agent sales". Agent Sales are not entered in the database until Earth Resources Regulation receives payment from the agent. This lag results in some discrepancy in the number of miner's right sold for a financial year. In some instances a miner's right may have been sold by an agent in one year but credited in the following year.

¹⁶ Victorian Environmental Assessment Council, *Investigation into additional prospecting areas in parks*, June 2013.

¹⁷ Earth Resources Regulation, unpublished data.



CAPITAL EXPENDITURE

New capital expenditure: \$624 million

Earth resources sector capital expenditure in Victoria decreased slightly year-on-year in 2019-20:

- Private new capital expenditure in the Victorian earth resources sector decreased by 4.3 per cent – from \$652 million in 2018-19 to \$624 million in 2019-20.

While national capital expenditure increased by 5.4 per cent in 2019-20 (Figure 5), overall both national and Victorian capital expenditure has been on a downward trend for a number of years. Victoria's 2019-20 capital expenditure decline may be linked to the onset of the coronavirus (COVID-19) pandemic; key concerns raised by industry during this time included cash flow pressures, delayed investment decisions and logistical complexities.

Between July 2019 and December 2019, Victoria recorded \$335 million of capital expenditure for the sector (tracking higher than the same period in 2018 which recorded \$326 million) compared to \$289 million of capital expenditure between January 2020 to June 2020. This represents a reduction of nearly 14 per cent from the first half of the 2019-20 period to the second half.

Upcoming projects can be a reliable lead indicator of future capital expenditure. Victoria has a total of 16 major projects in the pipeline with a value range of \$3.1 – 6.6+ billion (Table 3) this is an increase from 14 major projects with a value range of \$3.4 – 5.6+ billion from the year before.¹⁸ Over the long-term, when these projects move through to the final investment stage, they are likely to inject further capital expenditure into the sector.

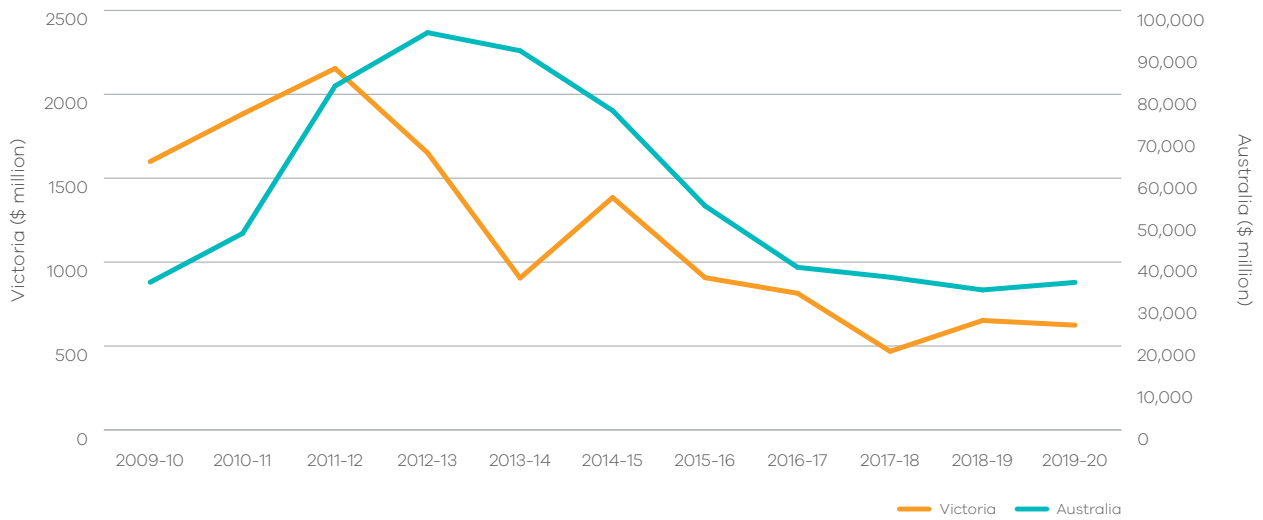
Table 3: Victorian Major Projects at 31 Oct 2020¹⁹

Stage	Projects (No.)	Value(\$billion)
Publicly Announced	3	0.4-0.9
Feasibility	11	2-5+
Committed	2	0.7
Completed	0	0
Total	16	3.1-6.6+

¹⁸ Office of the Chief Economist, *Resources and Energy Quarterly*, December 2020 – includes Resources and Energy Major Projects: 2019 (NB: These projects span several resource sector commodities).

¹⁹ Office of the Chief Economist, *Resources and Energy Major Projects: 2020* (NB: These projects span several resource sector commodities).

Figure 5: Private new capital expenditure (\$ million)²⁰



²⁰ ABS, 5625.0, Private New Capital Expenditure and Expected Expenditure, released 25/02/2021.
 Note: Private New Capital Expenditure and Expected Expenditure (5625.0) reports on mining in its entirety, therefore the data is inclusive of exploration expenditure.





PRODUCTION

Quantity: Minerals (Due to different units of measurement per commodity, no total is included here) – (Table 4), Extractives – 63.11 million tonnes (Table 7)

Sales Value: Total – \$2,941.7 million²¹

Minerals – \$1,880.4 million (Table 5)

Extractives – \$1,061.3 million (Table 6)

Victoria has a less diverse resource endowment and production of minerals compared to other Australian jurisdictions.

Table 4: Mineral production²²

Commodity	Unit	2018–19	2019–20	Change (%)
Brown coal	Tonnes (thousand)	42,256	40,372	-4.5
Gold	Ounce	567,501	792,267	+39.6
Antimony	Tonnes	2,016	3,141	+55.8
Zircon*	Tonnes	0	0	0
Rutile*	Tonnes	0	0	0
Ilmenite	Tonnes	0	61,197	+100.0
Gypsum [†]	Cubic metres	295,934	282,874	-4.4
Kaolin & fine clay	Tonnes	114,050	154,812	+35.7

* For 2019–20, no production occurred for these minerals.

[†] The 2018–19 production value for Gypsum has been revised up from 291,842 cubic metres. This is due to late returns submitted by the industry after the previous report is published.

²¹ Total excludes the value of gas production due to commercial sensitivity.

²² Earth Resources Regulation, 2019–20 Annual Statistical Report, p. 13.

Table 5: Mineral production sales values (\$ million)²³

Commodity	2018–19	2019–20	Change (%)
Gold	1,015.5	1,836.9	+80.9
Antimony	21.2	24.8	+17
Heavy mineral sands (incl. zircon, rutile, ilmenite)sands (incl. zircon, rutile, ilmenite)	0.0	9.5	N/A
Industrial minerals (incl. feldspar, gypsum, kaolin and fine clay)	10.3	8.9	-13.6
Other minerals (incl. silver, peat and quartz)	0.04	0.3	+650
Total (excl. brown coal)	1,047.0	1,880.4	+79.6

²³ Earth Resources Regulation, 2019-20 Annual Statistical Report, p. 13.

NB: 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

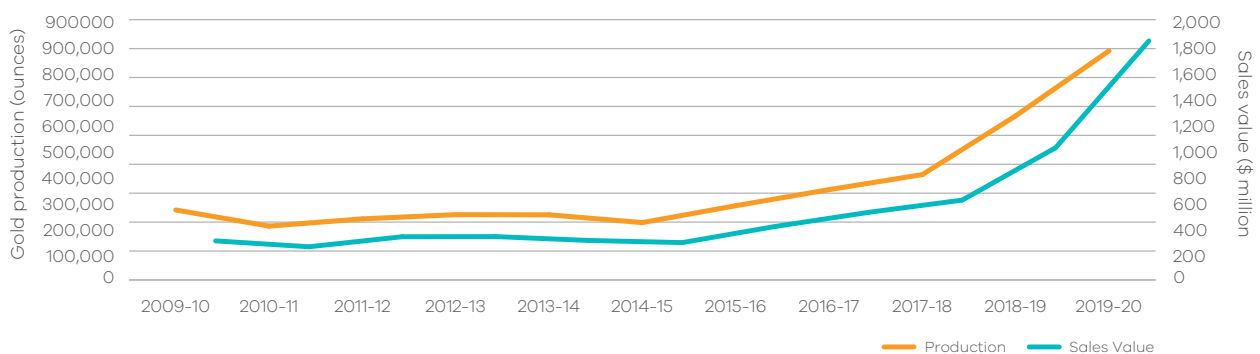
Gold production in Victoria significantly increased year-on-year in 2019-20:

- Gold production increased by 40 per cent – from 567,501 ounces in 2018-19 to 792,267 ounces in 2019-20.
- Sales value of gold produced increased by 81 per cent – from \$1.02 billion in 2018-19 to \$1.84 billion in 2019-20.

Gold production for the 2019-20 financial year was at levels not seen since 1906.²⁴ Continuing on from the success of the previous financial year, in 2019-20, 85 per cent of total gold produced in Victoria was produced at the Fosterville gold mine.²⁵ Fosterville is a world class, high-grade, low cost underground gold mine²⁶ and remains as Victoria’s largest gold mine by production and the third largest gold producer in Australia. In 2020 Fosterville produced 640,467 ounces of gold, beating the mine’s 2020 guidance of 590,000–610,000 ounces, mainly due to higher than planned tonnes processed and average grades during the second half of 2020.²⁷

The growth in the sales value of gold produced outpaced the growth of production in 2019-20 due to record-breaking prices for gold. The onset of the coronavirus (COVID-19) created economic shocks around the world, leading to volatility and uncertainty in global markets. This led investors to seek safe-haven assets such as gold which propelled gold prices in 2020 to an all-time high of A\$2,861 an ounce on 7 August 2020²⁸ with a yearly average of A\$2,581 an ounce²⁹ this propelled the growth in the sales value of gold. The development and rollout of highly effective coronavirus (COVID-19) vaccines and the global economic recovery, is expected to undermine some of gold’s appeal to institutional and retail investors. Investors are expected to move out of safe haven assets like gold which will contribute to a forecasted easing of gold prices in 2021 to 2022.³⁰

Figure 6: Gold production and sales values³¹



24 Data updated from Mudd (2007) (courtesy G M Mudd).

25 Earth Resources Regulation – unpublished data.

26 Kirkland Lake Gold, Fosterville Mine Information – <https://www.kl.gold/our-business/australia/fosterville-mine/default.aspx>

27 Kirkland Lake Gold, January 12, 2021 – Media Release – [pr-Q42020productionJan112021FINALREV1clean.pdf](https://www.kl.gold/pr-Q42020productionJan112021FINALREV1clean.pdf) (q4cdn.com)
NB: Kirkland Lake Gold is a Canadian company that reports on a Calendar Year.

28 Office of the Chief Economist, Resources and Energy Quarterly, December 2020 p.98.

29 Office of the Chief Economist, Resources and Energy Quarterly December 2020 p.98.

30 Office of the Chief Economist, Resources and Energy Quarterly December 2020 p.98.

31 Earth Resources Regulation, Annual Statistical Reports, 2009-2020.



GAS

Gas production: 9.83 petajoules

Gas produced in Victorian coastal waters decreased year-on-year in 2019–20:

- Gas production decreased by 36.2 per cent – from 15.4 petajoules in 2018–19 to 9.83 petajoules in 2019–20.³²
- Victorian demand for gas increased by 5.9 per cent – from 220 petajoules in 2018 to 233 petajoules in 2019.³³

There was a significant increase in gas used for gas-powered generation of electricity (GPG) in 2019 to support demand during a high number of unplanned coal-fired generation outages in Victoria.³⁴ Increased GPG consumption was the main driver for the increase in Victorian gas demand in 2019 compared to 2018.

Most of Victoria's gas demand is met from offshore gas reserves in Commonwealth waters in the Bass Strait. Gas produced in these offshore Commonwealth and Victorian waters is processed in Gippsland and South-West Victoria. Annual supply from offshore Victoria (Commonwealth and state waters) in 2020 was 307 petajoules.³⁵

Production in Victorian waters occurs at the Halladale and Speculant projects in the south-west of the state (Otway Basin). Beach energy indicated in its 2020 annual report that Victorian gas production in the Otway Basin fell due to a reduction in working interest investment and natural field decline.³⁶

The impacts of coronavirus (COVID-19) and changes to rig contracts has meant that expected drilling for Beach Energy's Enterprise and Artisan exploration prospects are to occur in the 2021 financial year.³⁷

In November 2020, Beach Energy announced a new gas discovery in the Victorian Otway Basin at its exploration well Enterprise 1. In February 2021 Beach Energy confirmed that the 2P (proved and probable) reserves include 97 PJ of sales gas (161 PJ gross) which is more than double Beach Energy's pre-drill expectation, significantly increasing the value of the discovery. Beach Energy also discovered gas in its Artisan 1 exploration well, located about 30 kilometres offshore in the Victorian Otway Basin.

Global oil and gas prices fell sharply in the first half of 2020, largely due to impacts on global transport, commercial and industrial sectors as a result of the onset of the coronavirus (COVID-19) pandemic.

Victoria's demand and supply balance for gas is tightening, with producers estimating a large reduction in the amount of available production due to several fields in the Gippsland and Otway basins being forecast to cease production.³⁸ Overall in the East Coast, there is projected to be sufficient supply to address demand until 2026, provided committed projects proceed as planned. In Victoria, supply from outside Commonwealth and Victorian waters will need to be relied upon in the coming decade, unless new local supplies or LNG import terminals are developed.³⁹

³² Earth Resources Regulation, *2019–20 Annual Statistical Report*, p. 19.

³³ Australian Energy Market Operator, *Victorian Gas Planning Report Update*, March 2020, p.4.

³⁴ Australian Energy Market Operator, *Victorian Gas Planning Report Update*, March 2020, p.4.

³⁵ Australian Energy Market Operator, *Victorian Gas Planning Report Update*, March 2021 p.16.

³⁶ Beach Energy Annual Report 2020, p.21.

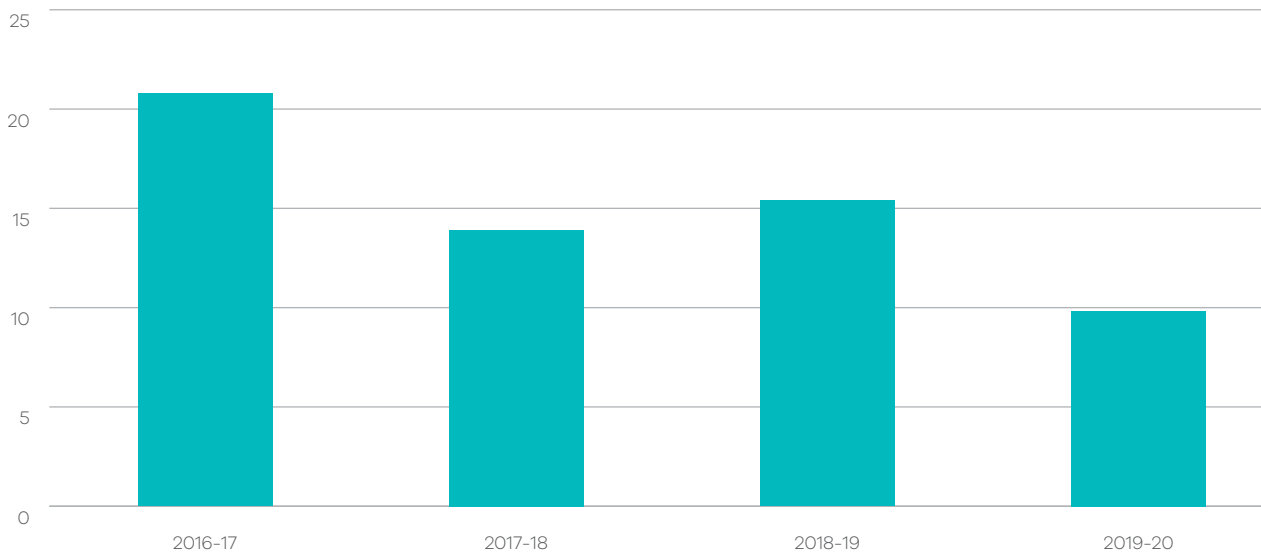
³⁷ Beach Energy Annual Report 2020, p.16.

³⁸ Australian Energy Market Operator, *Victorian Gas Planning Report Update*, March 2020 p.24.

³⁹ Australian Energy Market Operator, *Gas Statement of Opportunities*, March 2021 p.5.

Table 6: Gas production⁴⁰

Commodity	Unit	2018-19	2019-20	Change (%)
Gas	Petajoules (PJe)	15.4	9.83	-36.2

Figure 7: Gas production (petajoules)⁴¹

40 Earth Resources Regulation, 2019-20 Annual Statistical Report, p. 19.

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.

41 Earth Resources Regulation, 2016-17 to 2019-20 Annual Statistical Reports.



EXTRACTIVES

Production sales volume: 63.11 million tonnes
Production value: \$1.06 billion

Extractive resource production volume and value both increased year-on-year in 2019–20:

- Extractives production volume increased by 0.4 per cent – from 62.86 million tonnes in 2018–19 to 63.11 million tonnes in 2019–20.⁴²
- Extractives sales value increased by 3.7 per cent – from \$1.02 billion in 2018–19 to \$1.06 billion in 2019–20.⁴³
- 4 new extractive industry work authorities were granted in 2019–20, in addition to the 11 new extractive industry work authorities that were granted in 2018–19.⁴⁴

Since the 2013–14 financial year, extractive resource production in Victoria (both volume and value) has been consistently increasing each year. The upward trend continued in 2019–20,

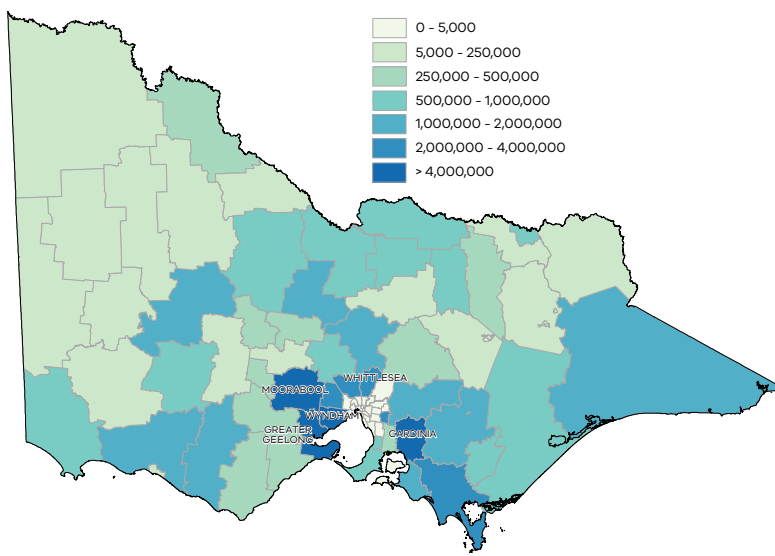
with more than 63 million tonnes of extractives being produced. This represents the highest level of extractive production recorded in Victoria over the past decade.⁴⁵

Future extractive resource production is anticipated to be supported by Earth Resource Regulation’s granting of four new work authorities during 2019–20. Work authorities granted as well as approvals for expanding existing quarries may vary each year due to the robust regulatory approvals process. Variations per year may also occur due to the Extractive Industry Priority Project List which identifies quarry projects to be given priority planning consideration.

In 2019–20, the top five extractive resource producing Local Government Areas (by volume) were Wyndham, Cardinia, Greater Geelong, Moorabool, and Whittlesea, respectively (Figure 8).

Figure 8: Annual Production

Annual extractives production volume (tonnes), by Local Government Area.⁴⁶



42 Earth Resources Regulation, *2019–20 Annual Statistical Report*, p.5 (2018–19 value revised up from 62.7 million tonnes).

43 Earth Resources Regulation, *2019–20 Annual Statistical Report*, p.5 (2018–19 value revised up from \$1021.63 million).

44 Earth Resources Regulation, *2019–20 Annual Statistical Report*, p.8.

45 DJPR analysis of Earth Resources Regulation Annual Statistical Reports 2010–11 – 2019–20.

46 Department of Jobs, Precincts and Regions. Note: Top five extractive resource producing Local Government Areas labelled.

47 Earth Resources Regulation, *2019–20 Annual Statistical Report*, p. 7.

Table 7: Extractives volume and value of production⁴⁷

Product Group	Product Type	2018–19 Sales Volume (thousand tonnes)	2019–20 Sales Volume (thousand tonnes)	Change (%)	2018–19 Sales Value (\$ million)	2019–20 Sales Value (\$ million)	Change (%)
Hard Rock	Basalt	25,460	25,910	1.8	435.2	444.6	2.1
	Dolerite	1	0	-100	0	-	-
	Gneiss	10	80	700	0	1.9	-
	Granite	5,350	7,060	32	117.7	138.8	18
	Hornfels	5,220	5,270	1	86.9	89.6	3.1
	Quartzite	30	10	-66.7	0.8	0.6	-20
	Rhyodacite	1,510	1,540	2	33.5	35.5	6
	Schist	480	430	-10.4	9.3	8.3	-10.6
	Slate	40	40	0	1.2	1.4	16.2
	Trachyte	30	30	0	0.7	0.5	-27.1
Sub-total		38,131	40,370	5.9	685.2	721.2	5.3
Soft rock	Clay & clay shale	1,200	1,310	9.2	3.5	4.8	38.4
	Limestone	1,980	1,930	-2.5	28.9	30.9	6.8
	Sand & gravel	16,670	14,700	-11.8	248.9	246.2	-1.1
	Scoria	760	920	21.1	13	15.1	16.3
	Sedimentary	3,760	3,410	-9.3	39.8	39.1	-1.6
	Soil	50	60	20	0.6	0.1	-83.9
	Tuff	320	410	28.1	3.5	3.8	10.3
Sub-total		24,740	22,740	-8.1	338.1	340.1	0.6
Grand total		62,871	63,110	0.4	1,023.3	1,061.3	3.7

Note: Because of rounding, numbers may not add.



EXTRACTIVES: DEMAND AND SUPPLY

Demand (Value of building work done):
\$40.4 billion

Supply (Total resource produced):
63.1 million tonnes

In 2019–20, the value of building work undertaken in Victoria was \$40.4 billion,⁴⁸ reflecting a 1.3 per cent year-on-year increase (Figure 9). This metric captures residential and non-residential construction projects. The value of work done for residential construction projects fell by around 2 per cent⁴⁹, whereas non-residential construction projects rose by around 9 per cent.⁵⁰

This level of construction activity resulted in demand for extractive materials exceeding 63 million tonnes in 2019–20—the highest volume of extractives produced in Victoria over the past decade.

Role of Construction Sector in Extractives Demand

Demand for extractive resources is driven primarily by the activity of the construction sector. Quarry-based construction materials are vital inputs to the building of residences, commercial buildings, roads and railways, and utilities, e.g. wind, solar and fossil fuel electricity generators, and water treatment facilities.

Construction projects are typically characterised as having long—sometimes multi-year—lead times from design and planning through to completion. Accordingly, construction project delivery is generally governed by long-term contracts. As such, the output of the construction industry typically lags the performance of the broader economy by around 12–18 months.⁵¹

Coronavirus (COVID-19) Impacts

The tendency of the construction sector to lag the economy has seen short-term demand for extractives remain strong throughout 2019–20, despite local and global uncertainty resulting from the coronavirus (COVID-19) pandemic.

Construction sector performance reported by the ABS suggests demand for extractives will continue to remain strong over the short-term. Coronavirus (COVID-19) related macroeconomic shocks, particularly in population growth, may have a negative effect on the construction sector,⁵² and by extension extractive resource demand, over the medium and long-term. This effect is expected to be offset to some degree by economic stimulus measures and construction sector investment from both Commonwealth and Victorian governments.⁵³

DJPR Demand and Supply Update

The government's *Helping Victoria Grow: Extractive Resources Strategy* (2018) acknowledges the need for high quality data on the extractives sector and commits to comprehensively update extractive resource demand and supply forecasts every five years. Throughout 2021, DJPR, under the oversight of the Extractive Strategy Taskforce, will be working with industry on this important analysis. The process will be strengthened by recent regulatory changes which require work authority holders to report estimates of resources yet to be extracted at their quarry sites. These new reporting requirements are expected to enhance the predictive accuracy of forward-looking projections of extractive resource supply in Victoria.

The comprehensive supply and demand update report is expected to be released publicly in 2022, with information included as part of the next edition of the Earth Resources Sector Indicators report.

48 ABS, 8755.0, Construction Work Done, released 25/11/2020.

49 ABS, 8752.0, Building Activity, released 20/01/2021.

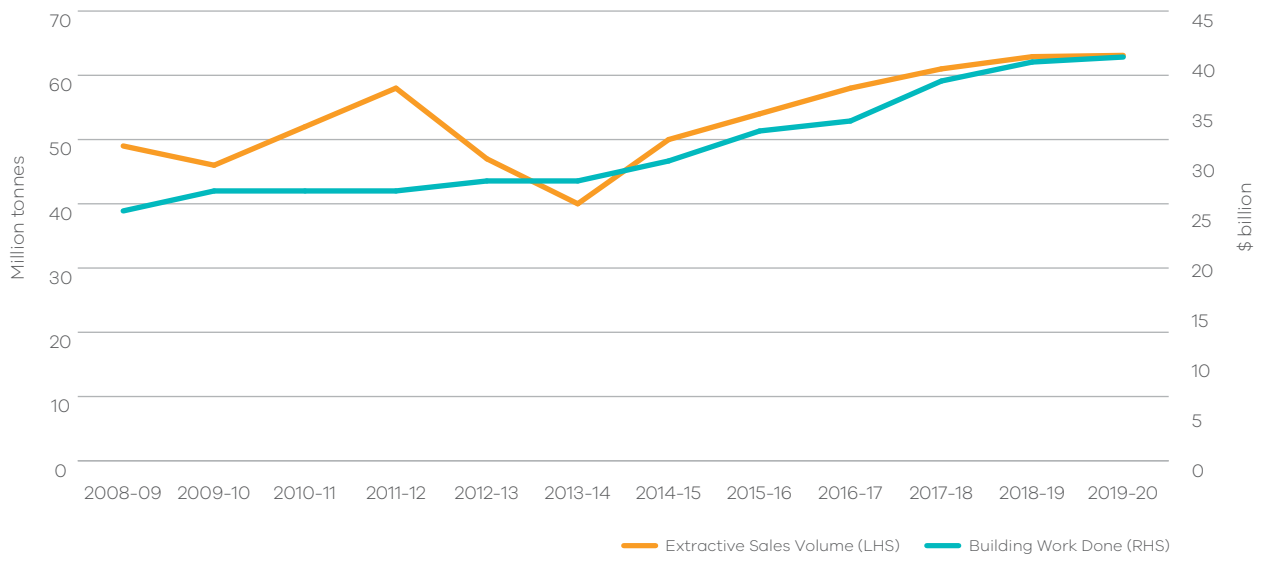
50 ABS, 8752.0, Building Activity, released 20/01/2021.

51 Reserve Bank of Australia, *Housing Construction Cycles and Interest Rates*, 2004.

52 National Housing Finance and Investment Corporation, *State of the Nation's Housing*, 2020.

53 Victorian government initiatives are listed in this report in "Victorian Government Policy—Extractives".

Figure 9: Extractive resources demand and supply⁵⁴



54 Earth Resources Regulation, Statistical Reports, 2008-2020 (Extractives Sales Volume) ABS, 8755.0, Construction Work Done, released 25/11/2020 (Building Work).





EMPLOYMENT

Employment volatility is reflected in data for the 2019–20 financial year. The Australian Bureau of Statistics (ABS) reported a reduction in Victoria’s average earth resources employment of 41 per cent year-on-year, from 16,000 in 2018–19 down to 9,400 in 2019–20.

However, the National Institute of Economic and Industry Research (NIEIR) reports employment for the Victorian mining sector at around 13,000 employed persons in 2019–20, a 16 per cent decrease from the year before. In addition to ABS labour force data, NIEIR’s calculation factors in census data, tax data, small area labour market data and is adjusted for COVID-19 impacts on employment for the sector.⁵⁵

Industry peak bodies have expressed that coronavirus (COVID-19) workforce impacts are nuanced across the sector. While the oil and gas sector has experienced some workforce reductions, the sector as a whole has performed strongly during the course of the coronavirus (COVID-19) pandemic.

The department is aware of some limitations with the ABS figures related to collection of labour force data for the Victorian resources sector, for example the Coal Mining industry division recorded a zero due to the small sub-population surveyed and it not meeting the characteristics of the definition. The department will continue to work with the ABS and explore opportunities to further improve reporting on this metric for future editions of the Earth Resources Sector Indicators report.

The Victorian mining sector remains a valuable sector to the economy and in 2019 it added approximately 23,500 full time indirect jobs across all sectors of the economy.⁵⁶ Average productivity in terms of output per worker for the mining sector is estimated at \$1.157 million, compared to the state’s average of \$0.321 million, and the mining sector ranks as the most productive for the state.⁵⁷

- The ten-yearly quarterly resource employment has ranged between 7,200 and 22,700.⁵⁸
- 49 per cent of Victoria’s resources jobs are outside Greater Melbourne, in rural and regional areas.⁵⁹
- 23 per cent of resources jobs are located in Melbourne CBD.⁶⁰

55 NIEIR employment data provided to the Department of Jobs, Precincts and Regions.

56 REMPLAN Economy – Impact modelling, informed by ABS data. Indirect jobs are a result of: Supply-chain effects: *The increased output generated by servicing industry sectors in response to the direct change in output and demand. Consumption effects: As output increases, so too does employment and wages and salaries paid to local employees who then go on and spend in the local economy.* According to REMPLAN Economy, based on the mining sector’s total output for 2019 which was \$9,478,373,232: Supply-chain effects resulted in 13,006 full time indirect jobs and consumption effects resulted in 10,665 full time indirect jobs. This is a total of 23,671 indirect jobs across all sectors of the economy including the mining sector.

57 REMPLAN Economy – Productivity report, informed by ABS data.

58 ABS, 6291.0.55.003, Labour Force, released 25/03/2021.

59 REMPLAN Economy – Employment reports, informed by ABS Census data.

60 REMPLAN Economy – Employment reports, informed by ABS Census data.





COMMUNITY

Gas

As part of the Victorian Gas Program, independent quantitative research was undertaken by the CSIRO between June and December 2019.

The survey's objective was to provide a statistically robust understanding of regional attitudes towards potential onshore conventional gas development in the Otway and Gippsland basins. It also measured views about a range of factors that are important to communities in relation to onshore community wellbeing.

The research methodology involved a telephone survey of a randomly selected representative sample of 801 residents – 501 in the Otway Basin and 300 in the Gippsland Basin. This covered communities with the municipalities of Corangamite, Moyne, Warrnambool, Glenelg, Southern Grampians, East Gippsland, Latrobe, and Wellington.

CSIRO's research:

- highlights a diversity of views in region Victoria about onshore conventional gas
- provides a baseline for future measurement of social acceptance of onshore conventional gas exploration and production.

Full reports are available on the earthresources.vic.gov.au website.





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's history is closely linked to the discovery of gold in the 1850s. In modern times, Victoria is undergoing a gold renaissance, as gold production and exploration expenditure continues to remain strong.

Victoria is a world-renowned gold province with a variety of deposit styles and world-class pre-competitive geoscientific data and knowledge to improve targeting and reduce mineral exploration risk. Central Victoria has produced more than 2,500 tonnes (approximately 80 million ounces) of gold. It is estimated that approximately 75 million ounces of gold may yet to be found in northern Victoria, which is almost the same as the total gold produced in Victoria to date.⁶¹

In 2019–20, Victoria's gold endowment continued to be a source of economic development, particularly in regional areas. There has been increased exploration and production success at the world-class Fosterville deposit. Fosterville is the third-largest gold producing operation in Australia, the lowest cost underground gold mine in the world⁶² and the second highest grade gold mine in the world.⁶³

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.

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.

61 Willman C.E. 2010, *Summary of geological findings Exploring for buried gold in Northern Victoria, Gold Undercover Report 24*, Geological Survey of Victoria.

62 Mines and Minerals, The world's lowest cost gold mines in Q1 2020 minesandmetals.com/2020/09/the-worlds-lowest-cost-goldmines-in-q1-2020/#:~:text=Lowest%20cost%20gold%20mines%20worldwide%3A%20Q1%202020%20Overview,%20%20488%20%206%20more%20rows%20

63 Mines and Minerals, Richest Gold Mines in The World minesandmetals.com/2020/07/richest-gold-mines-in-the-world/



Base metals

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. The Geological Survey of Victoria and Geoscience Australia has identified an area of western Victoria which may contain significant base metal deposits, particularly copper. In an area known collectively as the Stavely Arc, pre-competitive geoscience identified a geological setting and associated rock types consistent with the presence of large, disseminated copper (gold-silver) resources, potentially similar in type to those found in parts of South America.

Antimony

Over the past decade, Victoria has emerged as one of the top antimony producers in the world. Antimony is currently considered a critical mineral.⁶⁴ Costerfield in Central Victoria, is Australia's largest producing antimony mine. Antimony prospects are known in central and northeast Victoria. Antimony is used primarily in products such as airplane seats and in the dashboards of cars to make them resistant to fire. Antimony is alloyed with lead to increase charging characteristics in batteries and is increasingly being used in the semi-conductor industry it is, also used in electronic screen manufacturing.

Heavy mineral sands (and rare earth elements)

Victoria has globally significant resources and reserves of heavy mineral sands containing zirconium and titanium, both critical commodities in Australia's list of critical minerals.⁶⁵ These elements are concentrated in the heavy minerals zircon, rutile, leucoxene and ilmenite. Rare earth elements may also be contained within accessory minerals such as monazite and xenotime. Most heavy mineral sands activity is focused in the Murray Basin in west and northwest Victoria, but exploration and development opportunities also exist in Gippsland with the Fingerboards Project considered advanced.⁶⁶

Multiple strandline deposits have been developed previously in west and northwest Victoria. Billions of tonnes of heavy mineral sands resources in the WIM-style deposits of the Murray Basin are yet to be developed.

Victoria has the potential to supply critical commodities contained within heavy mineral sands for the modern world. 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.

Other minerals

Early stage lithium exploration continues in eastern Victoria, which could enable the state to access growth opportunities in energy storage technologies for expanding renewable and electric vehicle markets. Aluminium-lithium alloys also have use in aerospace technology.

64 Austrade Australian Critical Minerals Prospectus, Dec 2020.

65 Austrade Australian Critical Minerals Prospectus, Dec 2020.

66 Earth Resources, *Mineral Sands Fact Sheet*, 2019.

Coal

Brown coal continues to be 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.

In Victoria, coal is mainly used for electricity production and is largely an internal transfer within mining/generation entities.⁶⁷ By world standards Victoria's brown coal has relatively low impurities as it is typically low in ash, sulphur, heavy metals and nitrogen.⁶⁸

Beyond power generation, brown coal can be used as an alternative feedstock to produce a variety of high value products including carbon fibre, graphene, hydrogen and fertiliser. Domestic and international interest in using brown coal to produce these products is strong and the Victorian Government's *Statement on Future Uses of Brown Coal (2017)* outlines the state's policy position on projects that seek to use brown coal in a low emissions context.

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 has reached a major milestone, with hydrogen production successfully commencing at a dedicated facility in the Latrobe Valley. The Victorian Government's CarbonNet Project is establishing a commercial-scale carbon capture and storage (CCS) network hub in Gippsland, using world class offshore storage sites in Bass Strait. CarbonNet is a critical enabler for new industries such as clean hydrogen and fertiliser production, decarbonising industry, with potential for negative emissions through biomass. These projects are paramount in delivering world class carbon storage opportunities and enabling the use of coal in Victoria's net zero carbon future.

EnergyAustralia announced on 9 March 2021 that it would bring forward its closure of Yallourn Power Station from 2032 until 2028, providing a seven-year transition period for workers, the energy market and the community. This will likely bring forward the closure of the Yallourn Coal Mine. Since 2016, good progress has been made to manage the risks associated with early closure of the Latrobe Valley brown coal mines and to ensure that communities are supported when coal-fired power stations and associated mining operations reach the end of their life. EnergyAustralia has and continues to deliver progressive rehabilitation at its Yallourn mine site. Closure planning, studies and works will continue, consistent with regulations and government policy including the Latrobe Valley Regional Rehabilitation Strategy.

67 Earth Resources Regulation 2018-19 Annual Statistical Report.

68 Earth Resources Regulation Victoria.



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.

The Victorian Government is investing an unprecedented amount of more than \$100 billion in new infrastructure over 10 years to cater for growth. This includes the Metro Tunnel, the North East Link, and the West Gate Tunnel projects, it is also expected that this will drive demand for extractive resources in the short to medium-term. The supply of extractives will be critical to ensure the successful timely delivery of these projects. The government's *Helping Victoria Grow: Extractive Resources Strategy (2018)* sets out a plan to ensure that extractive resources continue to be available to support the state's growth.

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.

Sand and gravel

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 has the highest number of natural gas users in Australia, with over 2 million connected households and businesses relying on natural gas 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. Offshore Victoria has supplied, on average, 150 PJ/year to Tasmania, New South Wales and South Australia from its production surplus. This is forecast to decline to a deficit of 7 PJ in 2024.⁶⁹

Under the Victorian Gas Program in 2018, the government invited applications for five offshore areas totalling 1,318 square kilometres to secure future gas supplies. Applications closed on 15 February 2019 and submissions are now being assessed by the Earth Resources Regulation. In 2020, two exploration permits were granted for a period of six months. Operators are required to work closely with the commercial fishing industry, local communities and government bodies along the south-west coast as they conduct their exploration programs.

Onshore exploration and production of conventional gas will restart from 1 July 2021, following the passing of the *Petroleum Amendment Act 2020*. A best practice regulatory framework is currently being developed to support the restart. All new gas will be prioritised for domestic use.

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.

69 Victorian Gas Planning Report Update, AEMO, March 2020.



