

# Economic Development and Infrastructure Committee

## Inquiry into the benefits and drivers of greenfields mineral exploration and project development in Victoria

*Government submission*

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# 1. Executive summary

- The earth resources sector is a small but valuable part of Victoria's broad and diverse economy. The sector generates substantial economic and social benefits to Victoria and, in 2009-10, contributed \$5.9 billion towards gross state product (GSP).
- The sector contributes to economic prosperity, particularly in regional Victoria. It provides employment opportunities and consumes goods and services supplied by local businesses that form a vital part of the wider regional economy. More broadly, the sector is an important source of economic growth and stability.
- Victoria's earth resources include precious and base metals, mineral sands, extractives (such as stone and clay), and energy resources (including coal, oil and gas). These commodities are used to provide products for domestic consumption. Coal, oil and gas are used to generate competitively priced and reliable energy. Extractive resources provide raw materials for building and construction. Earth resources are also used as inputs to manufacture goods intended for both domestic consumption and export.
- The size and value of Victoria's earth resources sector has declined over the past decade. In 1989-90, the sector's gross value added (GVA) was \$9.8 billion; by 2009-10, the value of production had fallen by \$3.9 billion (or 40 per cent) to a total of \$5.9 billion. This reduction is largely due to a fall in petroleum production. Some parts of the earth resources sector, particularly minerals production, have increased in value but not enough to offset declines in high-value petroleum production.
- Exploration is an integral part of a sustainable earth resources sector because it can lead to discoveries that generate additional investment and increased economic activity; however, the overall level of greenfields exploration across Victoria is falling. In particular, current levels of greenfields exploration, aimed at finding new discoveries, appear subdued compared to historic levels. This shift may impair Victoria's long term ability to generate a pipeline of new resources.
- The share of global exploration budgets allocated to greenfields activity has fallen in the past 15 years, while the costs of exploration have risen. A shift away from greenfields exploration towards brownfields exploration has been exacerbated by a worldwide rationalisation of the industry and the global financial crisis (GFC). Since only greenfields exploration results in new discoveries, this means that new resources are not being identified. Global exploration budgets are also increasingly shifting away from Australia to other regions, such as Latin America. This trend is evident over the last ten years.
- Even where new deposits are discovered, few of these discoveries result in the commercial production of earth resources at a new operation site. For every 300 exploration licences, an average of about one project commences operation every five years.
- Most of Victoria's minerals production is sourced from provinces or deposits found 20 or more years ago. There has been limited capital expenditure on advanced mineral projects in the past two years, with few projects reported in Victoria's planning and development pipeline.
- Some of Victoria's earth resources, although known to be large in scale, cannot be extracted competitively at current market prices with existing technologies. Others, such as mineral sands, where Victoria has a known world class endowment, may present a highly valuable opportunity for the state.
- Victoria is commonly perceived as a small, densely populated jurisdiction, where accessible earth resources have been discovered already and, in some cases, exhausted. Close proximity between agricultural, commercial and residential activities

means that there is a common perception that land use and resource conflicts are likely. Available evidence suggests that this can have adverse implications for how Victoria is perceived as a prospective jurisdiction for new investment.

- The Fraser Institute survey indicates that Victoria is perceived as a jurisdiction with low mineral potential and limited prospects for exploration, with limited room to improve this perception by altering its regulatory framework. The survey has highlighted over the past five years that there is a strong, positive perception of the quality of Victoria's geological data provision; however, when considered alongside recent trends in greenfields mineral exploration there is no apparent evidence that greater data availability has led to an increase in greenfields exploration activity in the state.
- The provision of geological data allows the industry to identify areas of favourable mineral potential, reducing the costs and risks associated with greenfields exploration. Geoscience data can provide a foundation for exploration but increasing the amount of data is not sufficient, on its own, to stimulate high levels of this activity.
- The regulatory framework governing Victoria's mineral and extractive resources is the *Mineral Resources (Sustainable Development) Act 1990* (MRSDA). This legislation regulates exploration and development of mineral and extractive resources, including licensing and approvals, fees, charges, royalties and rehabilitation.
- Due to Victoria's size and high population density, it is important that regulation supports the active working of licences and effective and efficient land use. Recent amendments to the MRSDA will take effect in February 2012 and will introduce new licences and complementary requirements intended to ensure licences are actively worked and provide increased security of tenure for licence holders.
- The sector must also comply with various pieces of legislation, which set out the broader regulatory framework, addressing areas such as heritage, the environment (including water licensing, native vegetation and environment effects), Aboriginal heritage and occupational health and safety.
- Victoria has sought to promote investment in greenfields exploration through geological survey data. Major programs include the Victorian Initiative for Minerals and Petroleum, Developing Gold Undercover and Rediscover Victoria. Available evidence suggests that the sector attaches value to the information generated through these programs but it remains unclear whether providing this geological survey information has led to increased exploration activity across Victoria.

## 2. Introduction

At a time when many Australian jurisdictions have benefited from a strengthened pipeline of minerals projects closely linked to the recent global mining boom, Victoria's earth resources sector has been in decline. A fall in overall exploration and earth resources development activity, combined with very few or no planned earth resources projects in the pipeline, diminishes the likelihood that new, economically significant deposits will be developed in Victoria.

Under section 33 of the *Parliamentary Committees Act 2003*, the Economic Development and Infrastructure Committee is required to undertake the inquiry into the benefits and drivers of greenfields mineral exploration and project development in Victoria (the inquiry). The Terms of Reference for the inquiry recognise concerns about the current state of the sector in Victoria. At the same time, this reference is based on a clear recognition that the sector delivers value to the state and provides a number of commodities important to Victoria's wealth and prosperity. The Committee is also asked to:

- consider possible barriers to greenfields exploration and development and project attraction in Victoria in the context of a globally competitive industry
- identify appropriate responses that government and industry may take to address these issues.

The Terms of Reference for the inquiry are particularly focussed on greenfields exploration as exploration activity for new deposits in Victoria has been subdued. This problem is also being encountered more broadly in Australia. Earlier this year, the Policy Transition Group (PTG)<sup>1</sup> recognised this in its analysis of the implementation of the new resource taxation reforms and its recommendation for the Productivity Commission to examine regulatory barriers to exploration and report to the Council of Australian Governments.

This submission provides factual information, data and background on key issues, drivers and challenges for the industry in order to assist the inquiry. This submission does not address government policy.

Chapter 3 summarises the economic contribution of the sector in Victoria

Chapter 4 outlines the value of greenfields exploration, the implications for government and levels of exploration activity in Victoria and globally. It also provides an overview of perceptions of Victoria's resource endowment or 'prospectivity' and regulatory environment.

Chapter 5 provides an overview of each of Victoria's commodities, considering current levels of activity and future opportunities in terms of exploration and development. The scope of this inquiry does not include the offshore oil and gas sectors, although they are considered briefly here to provide context. Victoria's commodities include coal, gold (precious metals), mineral sands, feldspar, kaolin and gypsum.<sup>2</sup> Extractive products are also included, according to the scope of the inquiry.

Chapter 6 sets out Victoria's regulatory environment.

Chapter 7 looks at the taxation, royalties, fees and charges that apply to Victoria's earth resources sector.

Chapter 8 briefly outlines some of the previous initiatives and programs undertaken by the government to support Victoria's earth resources sector along with some different approaches and programs applied in South Australia and Tasmania.

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<sup>1</sup> A group formed in 2010 to advise the Commonwealth Government on the Mineral Resources Rent Tax

<sup>2</sup> Feldspar, kaolin and gypsum are low value commodities mined in small quantities in Victoria. These resources are not specifically considered in this submission.

## 3. The earth resources sector in Victoria

The purpose of this chapter is to outline the importance and activity of the earth resources sector in Victoria.

### Key points:

- Victoria's earth resources directly contribute \$5.9 billion to the state's economy, providing positive flow-throughs to other areas of the economy.
- The sector provides the raw materials essential to the energy, construction and manufacturing industries in Victoria.
- The economic contribution of Victoria's earth resources sector has fallen over the past two decades, largely due to the reduction in petroleum production.

### 3.1. Why does the earth resources sector matter to Victoria?

The earth resources sector has contributed to Victorian economic development since the discovery of gold in the 19<sup>th</sup> century. The discovery of oil in the Gippsland Basin during the 1960s created a further boom in the sector, generating direct wealth and employment to the Victorian economy.

The sector contributes almost \$6 billion towards gross state product (GSP) and remains a small but valued component of Victoria's diversified economy. The sector contributes, both directly in terms of employment and economic wealth, and indirectly through positive flow-throughs, to the economic wellbeing of the state.

The sector also provides Victoria with the raw materials essential to the functioning of the state. The extractive industry provides the hard rock, clay, sand and gravel that are vital for the construction industry, while the manufacturing sector requires earth resources as inputs to produce goods for domestic consumption and export. In 2004-05, the gross value added (GVA)<sup>3</sup> to the Victorian economy of these main manufacturing subdivisions that use earth resources as key inputs (petroleum, coal and assorted products, non-metallic mineral products and metal products) was \$9.8 billion.<sup>4</sup>

The coal, gas and oil that are extracted in the state have traditionally been used to generate competitively priced and reliable energy. The increasing demand for energy, coupled with the transition to a carbon-constrained economy, will place new demands on Victoria's energy earth resources. New technologies, such as geological carbon storage, coupled with harnessing new resources (such as unconventional gas and geothermal) may be required as we move towards a carbon constrained economy.

#### Regional and rural Victoria

In 2006, the earth resources sector provided employment to 6,227 people, over half of whom lived in regional Victoria.<sup>5</sup> Earth resources are found to varying degrees in all Victorian regions and provide benefits to those areas in which operations are based. The earth resources sector exports goods from the region, supplies inputs into other sectors (such as manufacturing) and provides downstream employment opportunities. The sector also contributes to the diversification of regional economies and associated economic growth and stability.

<sup>3</sup> GVA measures the contribution of an industry to the overall production of goods and services in an economy.

<sup>4</sup> Australian Bureau of Statistics 2009, *2008 Australian year book*, cat. no. 1310.0, ABS, Canberra. (2004-05 figures are the most recent available).

<sup>5</sup> Australian Bureau of Statistics 2007, *2006 Census Table- Balance of Victoria (Major Statistics Region) – Industry of Employment based on place of usual residence*, cat. no. 2068.0, ABS, Canberra.

*The Victorian Competition and Efficiency Commission notes, in its inquiry into regional development and regulation, "it is not unusual for ...[earth resources industries] to be the largest economic activity in the small communities in which they are frequently located, which means that their economic and social impacts appear magnified relative to other industries".<sup>6</sup>*

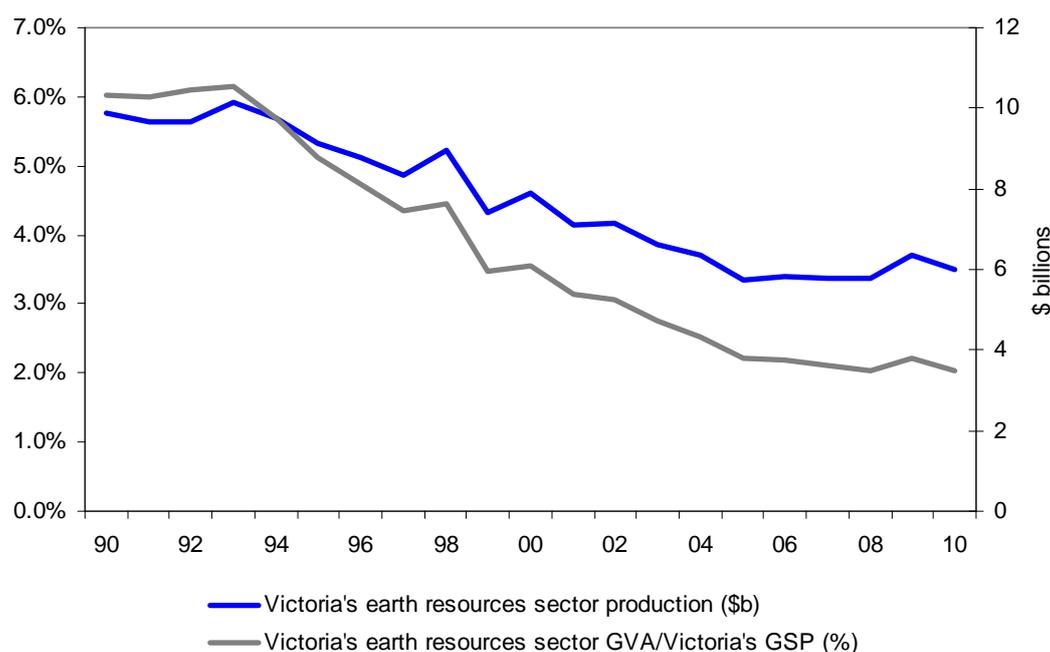
It is likely that, while the sector accounts for a small proportion of direct employment, it has a higher relative importance in local areas that are characterised by elevated levels of unemployment and disadvantage. The benefits of the sector are magnified in small communities, where the existence of additional medium to long term employment with high wages can have significant flow-through to the rural economy.

### 3.2. Victoria's production activity

In 1989-90, the sector's gross value added was \$9.8 billion; by 2009-10, production had fallen by \$3.9 billion (or 40 per cent) to a total of \$5.9 billion. This represented a fall in the economic contribution of the sector from six per cent to two per cent. Figure 1 shows Victoria's production, including petroleum, mineral resources and extractive resources, from 1989-90 to 2009-10.

The fall in production in terms of GVA over the past two decades is largely due to the reduction in petroleum production. There has been an increase in GVA from other mineral resources; however, this increase has not kept pace with the rest of the economy and is more tempered compared to the value that has been lost due to the fall in production of high value petroleum products. Chapter five discusses production levels for individual commodities.

**Figure 1. Mining production and contribution to gross state product, Victoria<sup>7</sup>**



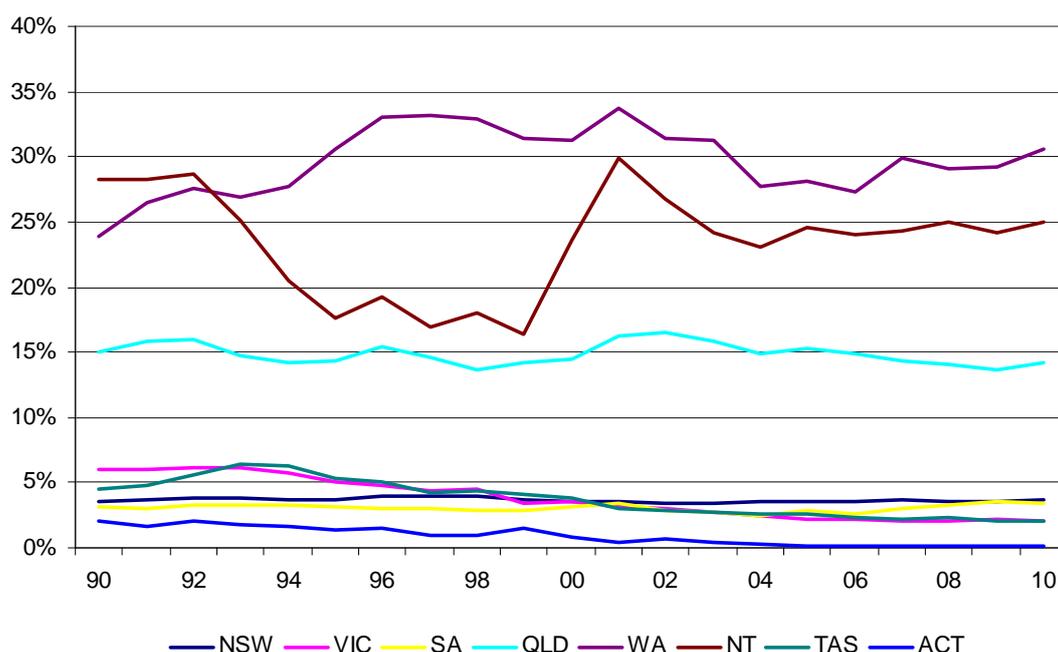
The economic contribution of Victoria's earth resources sector to the wider economy over the last two decades has been consistently smaller than that experienced by the resource rich jurisdictions of Queensland, the Northern Territory and Western Australia. This is shown in Figure 2.

A boom in global demand for earth resources commodities over the last six years has magnified this. This boom was most marked in Western Australia, the Northern Territory, Queensland, South Australia and, to a lesser extent, New South Wales.

<sup>6</sup> Department of Treasury and Finance 2005, *Regulation and Regional Victoria, Challenges and Opportunities*, DTF, Melbourne, p. 288.

<sup>7</sup> Australian Bureau of Statistics 2010, *Australian National Accounts: State Accounts*. cat. no. 5220.0, ABS, Canberra.

Figure 2. Contribution of the mining industry to gross state product, by jurisdiction<sup>8</sup>



Australian jurisdictions may be classified into two broad groups, with Victoria belonging to the latter:

- Group one comprises Western Australia, Queensland and the Northern Territory, which together represent a set of resource jurisdictions where the earth resources sector accounts for more than 13 per cent of the economy
- Group two comprises New South Wales, Victoria, Tasmania, South Australia and the ACT and represent a set of jurisdictions where the earth resources sector contributes less than six per cent to economic activity.

Increased iron ore and black coal prices over the last five years are reflected in the significant rise in both pecuniary and volume production in resource jurisdictions with large deposits of these commodities, such as Western Australian and Queensland. These resource states have expanded their mines in response to large price increases. Victoria has no significant deposits of such high value bulk export commodities and has had, at best, only limited opportunity to take advantage of this increase in global demand.

<sup>8</sup> Australian Bureau of Statistics 2010, *Australian National Accounts*, cat. no. 5220, ABS Canberra (data not publicly available).

## 4. Greenfields exploration

This chapter outlines the value of exploration to the earth resources sector, the implications for government and levels of exploration activity in Victoria and globally.

### Key points:

- Greenfields exploration is vital to maintain the pipeline of new resource projects, without which depleting resources will not be replaced.
- A fall in the level of greenfields exploration in Victoria means that few reported projects are in the planning and development pipeline.
- The reduction in greenfields activity is an issue at state, national and international levels; this is compounded in Australia because exploration activity in general has moved towards other global regions.
- In the Fraser Institute Mining Survey 2011, Victoria was rated as having poor perceived mineral potential, the lowest out of all Australian jurisdictions.
- Victoria is perceived as having very little room to improve the perceptions of its mineral endowment through changing its regulatory framework.

### 4.1. Why does exploration matter?

Exploration is an integral part of the production process. Greenfields exploration targets new discoveries that can lead to additional projects and greater economic activity (brownfields exploration refers to exploration conducted at existing deposit sites). Successful greenfields exploration may be followed by major investment in earth resources sector.

The chances of an individual exploration attempt resulting in a viable mining opportunity are low. Even where a company undertakes new exploration activities as part of a portfolio based approach, intended to spread risk, it is unclear that greenfields exploration results in an adequate return on investment.<sup>9</sup> As a result, the earth resources sector may prefer to focus on confirming the potential of already known resources, which have a greater chance of success.

Brownfields exploration has tended to dominate exploration expenditure in Victoria and other Australian states and territories over the last decade. Across Australia, it appears that there has been some shift away from greenfields exploration towards brownfields exploration in response to the global demand for resources. Rapidly growing commodity prices have provided earth resources with a strong incentive to expand production drawing upon current deposits and known reserves. This appears to reflect, and is consistent with, a broader global trend.

The shift away from greenfields exploration can impair the long term ability to generate a pipeline of new resource stocks. Depleting resources will not be replaced without this pipeline. The likelihood of replacing depleting reserves in Victoria through greenfields exploration is diminished by a shift in global exploration budgets over the last 10 years, away from Australia towards other regions, notably Latin America and other less developed regions.

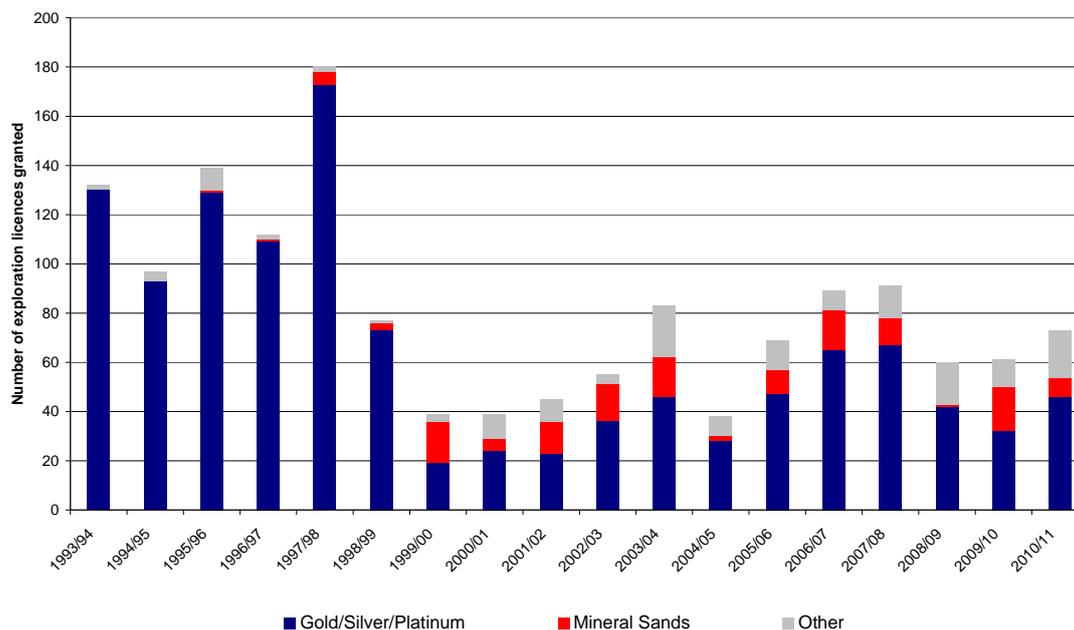
### 4.2. Victoria's exploration activity

The overall number of mineral exploration licences granted in Victoria has fluctuated over the last 16 years from 1994 to 2010, as shown in Figure 3. The 1990s were characterised by high levels of new exploration licences being granted. An average of around 140 mineral exploration licenses were granted annually in Victoria between 1994 and 1998. Since 1999, this figure has fallen by over 50 per cent with around 60 mineral exploration licences being granted. Over the past 10 years, the number of exploration licences granted for gold

<sup>9</sup> Shodde, R 2011, Recent trends in Australian exploration, AMEC Convention 2011, Perth.  
<http://www.minexconsulting.com/publications/jun2011.html>

exploration has declined, as new licences have been granted across a broader range of commodities, most notably mineral sands.

**Figure 3. Mineral exploration licences granted, Victoria<sup>10</sup>**



The downturn in the number of exploration licences granted after 1998 may be attributable, in part, to a worldwide industry rationalisation and consolidation that occurred in the late 1990s. Major developers reduced their expenditure on greenfields exploration, having concluded that it was more cost effective to purchase discovered resources rather than invest money in discovery. This was a global phenomenon that appears to have had more enduring and adverse effects on exploration activity and industry structure of Victoria's earth resources sector. Typically, there is a long lead time from discovery of a resource to operation; the fall in the number of exploration licences granted from its peak in 1997-98 is now beginning to effect project development.

Global consolidation means that greenfields exploration is increasingly undertaken by small and medium size specialist explorers. The PTG found that "these smaller, entrepreneurial entities are willing to accept the high risk profile of such exploration. As such, they have a distinct and important role in maintaining the long term pipeline of future resource projects".<sup>11</sup>

The importance of the number of exploration licenses granted to future production is highlighted through the conversion rate to new mines. Victoria has granted 627 new exploration licenses in the past 10 years. During the same period of time, two new mines have commenced production – roughly calculated, this suggests a conversion rate of around 300 exploration licenses for one mine every five years. It also generally takes up to 10 years for a newly identified mineral resource to be developed and enter the operations phase.

### Project development pipeline

There are few reported projects in Victoria's planning and development pipeline. The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) reported in April 2011 that there was one advanced minerals project and two less advanced minerals projects in Victoria, one of which is currently on hold.<sup>12</sup>

<sup>10</sup> DPI 2011, *2009-10 Statistical Review – Victoria's Minerals, Petroleum and Extractive Industries (2009-10)*, East Melbourne, p. 21; DPI 2004, *Statistical Review 2002-03 Minerals and Petroleum Division*, East Melbourne, p. 7.

<sup>11</sup> Policy Transition Group 2010, *Issues Paper – Technical Design of the Mineral Resource Rent Tax*, Canberra, p.111.

<sup>12</sup> ABARE (2010), *Tabular list for Minerals and energy: major development projects - October 2010*, <http://www.abare.gov.au>

Capital expenditure on advanced mineral projects (not including energy earth resources projects) has been minimal in Victoria during recent years. In April 2010, there was no expenditure on advanced mineral projects in the state. The most recent data for April 2011 shows that there is expenditure on advanced mineral projects taking place in the state, but the total value of these projects is \$32 million compared to a total value of \$33.5 billion across Australia. This reflects the fact that there is limited activity in Victoria's project development pipeline.

The overall low level of activity may mean significant increases in current production levels in the short and medium term are unlikely. This trend may also indicate that the continued future development and expansion of Victoria's earth resources sector is at risk in the longer term, especially when combined with available evidence indicating that greenfields exploration activities are low compared with previous levels of activity.

### 4.3. Challenges for government policy

The earth resources sector's approach to exploration investment in new projects, focusing on brownfields exploration and acquiring discovered resources to maximise returns on their investment and minimising losses, may mean that there is underinvestment in greenfields exploration. A pipeline of new resource stocks needed for a sustainable sector is not being generated.

A number of reasons have been proposed to explain why private firms may not invest in the amount of greenfields exploration needed to support a sustainable earth resources sector, especially in developed, mature jurisdictions like Victoria. These reasons can include:

- risk and uncertainty across the resources exploration industry, which leads to exploration activity falling to low levels
- the lack of geological knowledge of regions and deposits that decreases the probability and increase the costs of discovery
- the lack of publicly available geoscientific data, which may deter companies from undertaking their own data collection due to the existence of 'free riders'.<sup>13</sup>

One of the ways that governments in developed jurisdictions, such as Victoria, seek to address these externalities and stimulate greenfields exploration is through improving the provision of information regarding the geology of land areas – geoscience data.

Figure 4 shows how geoscience information is commonly considered as contributing to the exploration and development process.

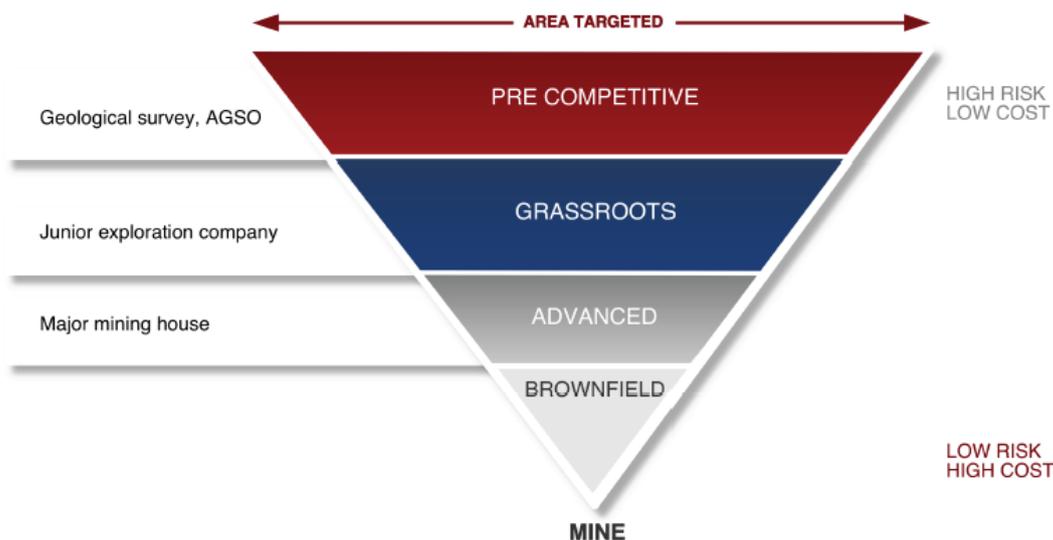
A number of arguments have been proposed to support the public provision of geoscience data. These include:

- allowing industry to identify areas of favourable mineral potential, minimising the location constrained nature of mineral exploration
- increasing efficiency by making it unnecessary for individual companies to duplicate common information
- reducing exploration costs and risks that are attributable to the high risk nature of mineral exploration.
- identifying and, as a result, reducing money spent on non-prospective ground
- developing new approaches to modelling geological data, allowing exploration companies to reconsider possibilities using historic data.<sup>14</sup>

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<sup>13</sup> Parliament of the Commonwealth of Australia 2003, *Exploring: Australia's future-Impediments to increasing investment in minerals and petroleum exploration in Australia*, a House of Representatives: Standing committee on Industry and Resources inquiry report, Canberra, pp. 50-51.

Figure 4: The exploration triangle<sup>15</sup>



The extent to which providing geoscience data stimulates greenfields exploration, however, remains unclear. Victoria has very good geoscience data but, at the same time, the state's prospectivity is perceived to be very low compared to other developed jurisdictions. Evidence from Victoria's geological information programs indicates that, while the data provision is valued by the industry, there is no clear causal link between this and an increase in greenfields exploration activity (discussed in more detail in chapter 9). Geoscience data provides a foundation for exploration but is not sufficient, on its own, to stimulate high levels of this activity.

The Department of Primary Industries' (DPI) Earth Resources Development Division (ERDD), incorporating Geoscience Victoria (GSV),<sup>16</sup> has responsibility for collating and providing geological survey information. This information can also realise public benefits through its use by government agencies for a range of diverse purposes. The key objectives of this work are to:

- facilitate the work of explorers through the provision of geological and resource data
- promote Victoria's potential
- safeguard geological information
- ensure the government is informed of the extent and value of the resources to Victoria.

GSV has responsibility for undertaking geological surveys as well as collecting, enhancing and providing existing geoscientific information to the private sector.

#### 4.4. Global exploration activity

Total worldwide exploration expenditure (dominated by brownfields expenditure that is not related to discovery) has experienced a rise since the beginning of the century (Figure 5), although this was affected by the Global Financial Crisis (GFC). The causes of this increase may be attributable to increased spending as a result of increased access to capital and higher commodity prices.<sup>17</sup>

The rise in global exploration expenditure should be considered in conjunction with the rise in exploration costs experienced over the same period of time. The Metals Economic Group

<sup>14</sup> Duke, J.M. 2010, *Government geoscience to support mineral exploration: public policy rational and impact*, a report prepared for Prospectors and Developers Association of Canada, March.

<sup>15</sup> Adapted from South Australian Government 2003.

<sup>16</sup> Further information on Geoscience Victoria can be found at <http://www.new.dpi.vic.gov.au/earth-resources/about-earth-resources/branches/geoscience>.

<sup>17</sup> Metals Economic Group 2010, *World Exploration Trends*, Metals Economics Group, Canada.

suggests that substantial increases in exploration budgets from 2004 to 2008 did not lead to a proportionate rise in actual exploration activity. Some of these higher costs were due to higher levels of demand for a range of services, such as drilling and assaying, and rising costs for inputs such as skilled labour, fuel and infrastructure.

**Figure 5. Estimated worldwide exploration budget totals (excluding uranium), 1996–2009<sup>18</sup>**

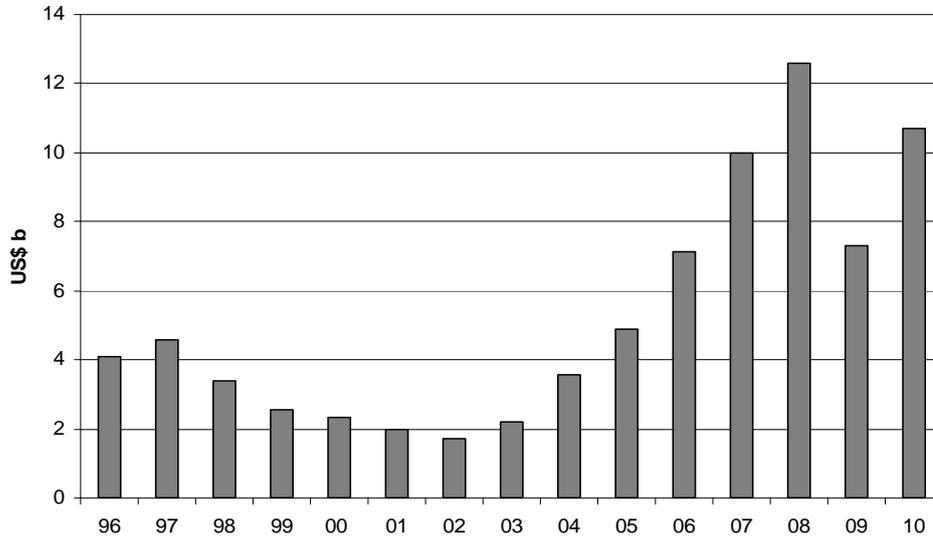
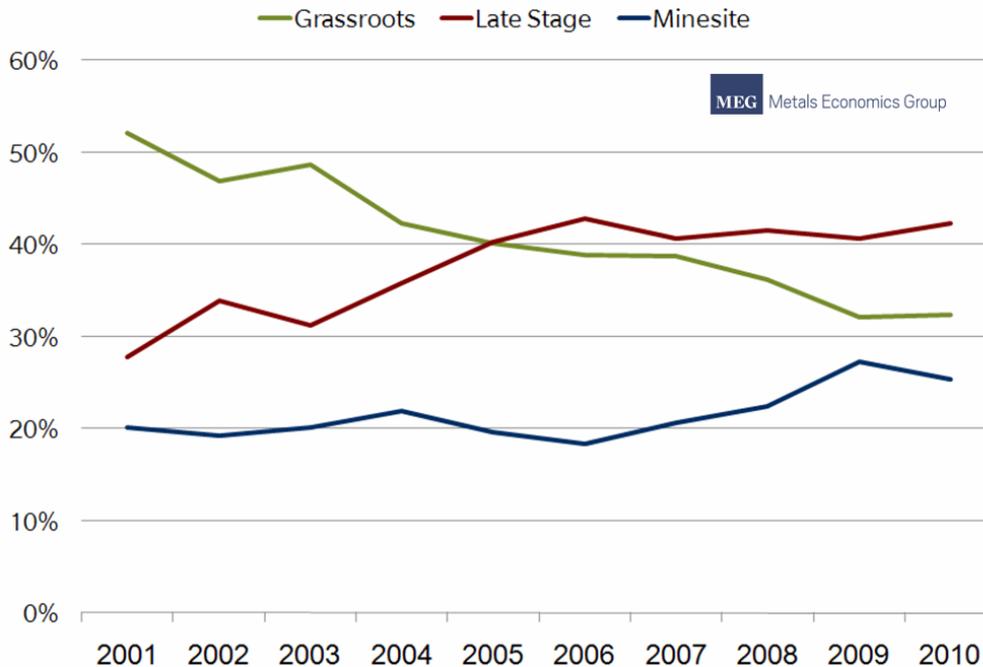


Figure 6 shows that the share of exploration expenditure being spent on greenfields (or grassroots) activity has fallen since the late 1990s.

**Figure 6: Worldwide exploration by stage (%)<sup>19</sup>**



Expenditure on greenfields exploration activity currently accounts for approximately a third of all global exploration expenditure, having accounted for over half of the expenditure in 1996.

<sup>18</sup> Metals Economic Group 2010, *World Exploration Trends*, Metals Economics Group, Canada, p. 3.

<sup>19</sup> Metals Economic Group 2010, *World Exploration Trends*, Metals Economics Group, Canada, p. 3.

The reduction in greenfields exploration activity experienced in Victoria appears to be part of a wider global trend, as organisations focus exploration activity on brownfields exploration, although it has been more strongly pronounced in Victoria than in many other jurisdictions.

#### **4.5. Perceptions of prospectivity**

The Fraser Institute conducts an annual survey of metal mining and exploration companies (the survey) to assess how mineral endowments and public policy factors such as taxation and regulation affect exploration investment. The survey measures:

- perceptions of the resource endowment – the Mineral Potential Index measures perceptions of the resource endowment; this assumes no regulations apply and industry best practice is in place
- perceptions of the regulatory framework – the effects of government policy on exploration decision making are surveyed, including environmental regulation, interpretation and enforcement of regulations, regulatory duplication, taxation, native title land claims, uncertainty regarding the administration of regulation, infrastructure, political stability, labour issues, geological database and security
- perceptions of policy potential – the Policy Potential Index is a composite index measuring the perceptions of overall policy attractiveness of jurisdictions and resource endowment.

Victoria was rated as having poor perceived mineral potential on the Fraser Institute's Mineral Potential Index in 2010-11. Victoria's ranking on this index was the lowest of all Australian jurisdictions and ranked 76<sup>th</sup> out of the 79 global jurisdictions included in the survey.

There is very little difference between the perceptions of Victoria's mineral endowment when no regulations and industry best practise apply and the perceptions when Victoria's current suite of regulations is applied. This suggests that even if Victoria were to change its regulatory framework to the survey's assumption of 'best practice', it would make a minimal difference to the perception that there are limited prospects for exploration within the state.

While changes to the regulatory framework alone are unlikely to drive increased exploration, ensuring an efficient regulatory process within the state remains an important goal. The survey indicates that benefits are perceived to be gained from changing some regulations, specifically environmental regulations and regulatory duplication and inconsistency.

The survey shows that there are positive perceptions of the quality of Victoria's geological data, with all surveyed organisations viewing Victoria's data provision as either encouraging investment or not acting as a deterrent to investment. Strong, positive perceptions of Victoria's geological data has been consistent over the past five years of the survey; however, over this period of time, greenfields mineral exploration across Victoria has been subdued. There is no clear correlation between high quality geological data and increased levels of greenfields exploration shown in the Fraser Institute survey or in any other studies available to DPI, although there are other factors, such as the impact of the GFC and access to capital, that will have influenced firms' decisions to invest in exploration activity.

Table 1 shows Victoria with the 10 jurisdictions with the greatest perceptions of resource endowment, assuming no regulations. The land areas for the top performing jurisdictions are all considerably larger than the land area of Victoria.

**Table 1: Fraser Institute's Mineral Potential Index 2010-11 and land area**

	Mineral Potential Index score	Land area (square km) <sup>20</sup>
<i>Alaska</i>	0.93	1,481,346
<i>Yukon</i>	0.9	474,391
<i>Columbia</i>	0.9	1,109,104
<i>Democratic Republic of Congo</i>	0.9	2,267,048
<i>Saskatchewan</i>	0.89	591,670
<i>Papua New Guinea</i>	0.89	452,860
<i>Western Australia</i>	0.87	2,529,875
<i>North West Territories</i>	0.87	1,183,085
<i>Brazil</i>	0.86	8,459,945
<i>Mexico</i>	0.86	1,943,945
<i>Victoria</i>	0.42	227,416

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<sup>20</sup> Land area excludes inland water bodies (lakes, reservoirs, rivers).

## 5. Victoria's commodities

This chapter outlines the current status of each of Victoria's commodities and the opportunities that may exist for those commodities in the future.

### Key points:

- The introduction of policies aimed at reducing carbon emissions are likely to produce an increase in the cost of using coal-fired electricity generators, reducing demand for brown coal as alternative energy sources are sought.
- Opportunities for increased production exist for these alternative sources, including both conventional and unconventional gas and geothermal energy.
- Significant deposits of mineral sands that have been discovered in Victoria have not been fully developed. The application of new technologies is essential for exploitation of the reserves and developing the long life mining operations.
- There is no significant production of base metals in Victoria; however, the nature of Victoria's geology may present opportunities for the exploration and development of base metals and disseminated gold in the future.

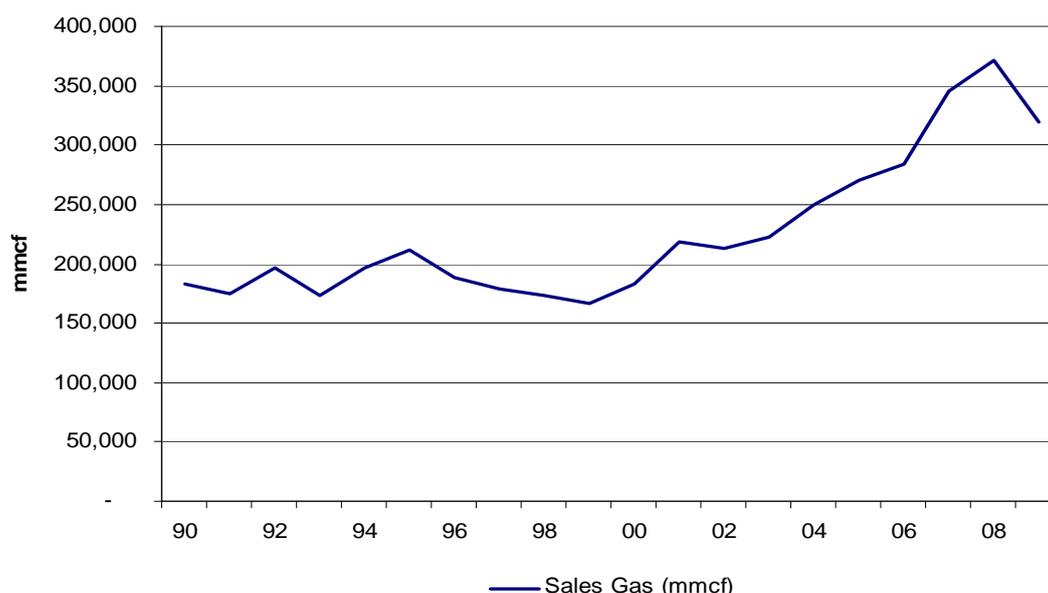
### Conventional and unconventional gas

Victoria contains four major gas fields in the Gippsland Basin. Considerably smaller gas deposits have also been discovered in the Otway Basin.

Sales gas is the only sub-sector of petroleum which has seen a significant rise in output in the last two decades in Victoria. Figure 7 shows the production of sales gas in Victoria since 1990. The increase in gas production since 2000 is attributable to the Interlink gas pipeline. This pipeline was completed in 1998 and joined the Victorian and the New South Wales gas pipeline systems. It opened up gas markets and stimulated interest in developing existing gas discoveries and exploring for new gas.

Gas demand is highly seasonal, with an average demand of 700 million cubic feet per day (mmcf/d) in winter and about 500 mmcf/d in summer.

Figure 7: Production of sales gas, Victoria<sup>21</sup>



<sup>21</sup> DPI 2010, 2008-09 Statistical Review – Victoria's Mineral, Petroleum and Extractive Industries, East Melbourne.

Gas production has been increasing at an annual average rate of two per cent and greater growth is expected due to anticipated growth in baseload power generation from gas.<sup>22</sup> In the future, there is likely to be increased domestic demand for gas, especially in the context of a significant carbon price, where it will be an important strategic fuel for new power generation facilities. The emissions intensity of gas is lower than coal, making it suitable for supplying baseload electricity and complementing intermittent renewable energy.

Victoria currently exports gas across eastern Australia; however there are a number of scenarios that suggest that a range of factors will drive change in the national gas market. Estimates of future gas demand, taking into account the likely development of already identified deposits and projecting forward current discovery rates, suggest that reserves of conventional gas in Victoria will be entirely consumed sometime around 2030.<sup>23</sup> This scenario would result in imports from other states (for long-term contract purposes) in advance of that time. Such a development would reverse Victoria's status as a gas exporter and would be expected to increase gas prices in the state. Higher prices may, at the same time, stimulate increased exploration activity.

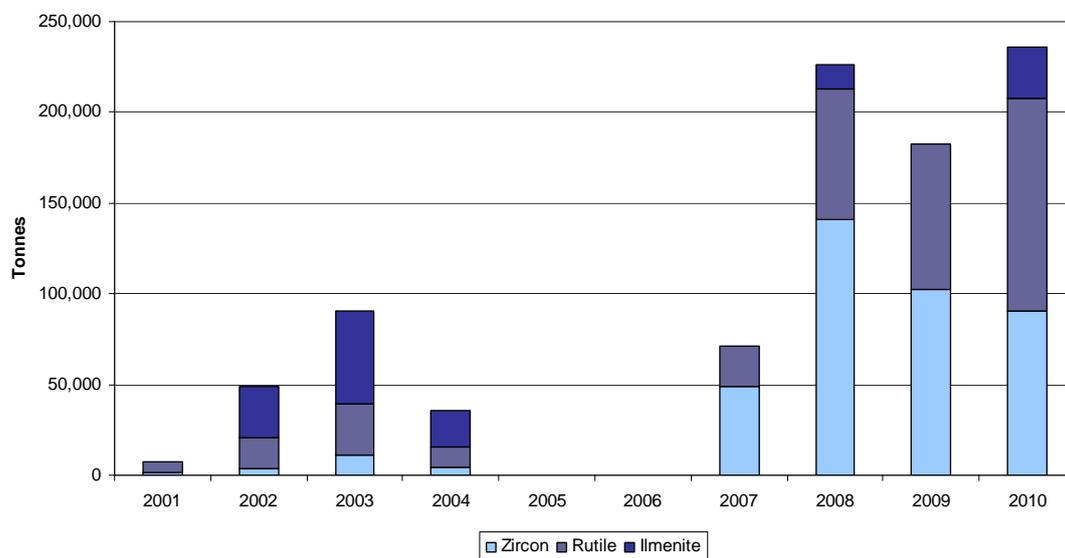
Increased exploration may lead to the location of proximate undiscovered conventional and unconventional gas resources (tight gas, shale gas, and coal seam methane). Unconventional gas is produced from complex geological systems; it is normally difficult to produce and requires innovative technological solutions for extraction. Globally, gas from unconventional sources has increased the understood reserves of gas and resulted in significant shifts in prices associated with supply for domestic use in those jurisdictions.

### Mineral sands

Mineral sands contain suites of economically important minerals of high specific gravity known as 'heavy minerals'. These include minerals rich in titanium and zirconium that are found in very low concentrations in a variety of igneous and metamorphic rocks. The principal heavy minerals of commercial interest are rutile, zircon, ilmenite and leucoxene.

Mineral sands production in Victoria is shown in Figure 8.

**Figure 8: Mineral sand production (tonnes), Victoria<sup>24</sup>**



<sup>22</sup> ABARE, *Energy in Australia 2010*, p. 43.

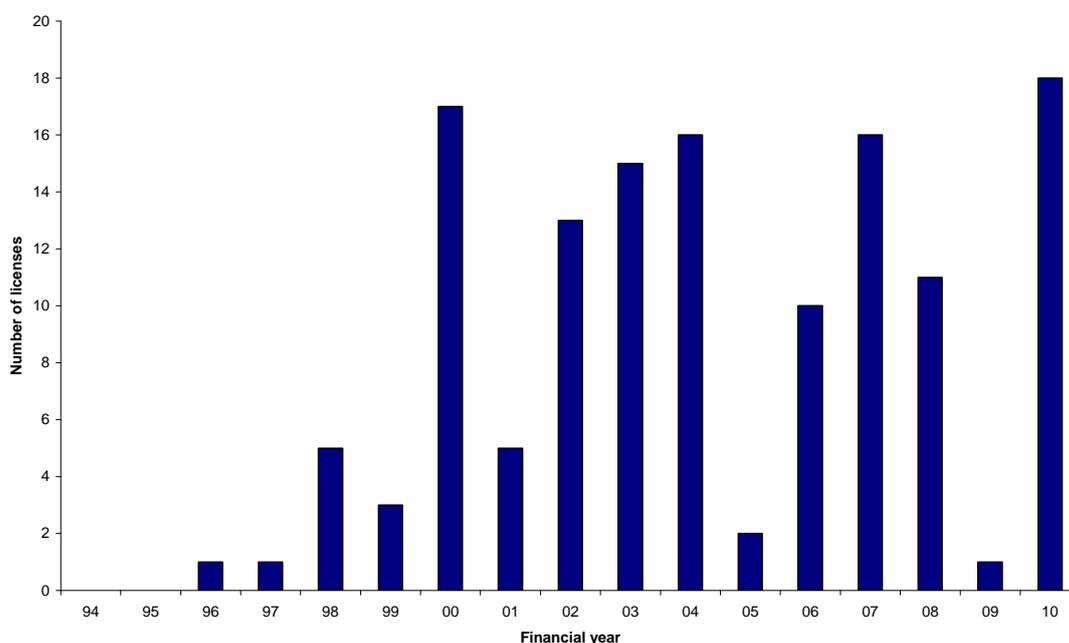
<sup>23</sup> Australian Energy Market Operator Ltd (AEMO) 2010, *Gas statement of opportunities*, Melbourne, p.122 and DPI's own working

<sup>24</sup> DPI 2011, *2009-10 Statistical Review – Victoria's Mineral, Petroleum and Extractive Industries*, East Melbourne, p. 27.

Mineral sands production has grown steadily since 2007, after experiencing a gap in production between 2004-05 and 2005-06, because of the closure of the Wemen Mine in 2004. Iluka's Douglas mine commenced production in 2007, accounting for the increase in production experienced in the past three years. There are currently three mines operating in Victoria, all managed by Iluka and all operating within the Murray Basin. The Victorian Government has recently worked with Iluka to facilitate transport of mineral sands by rail to processing sites, offering a more efficient and cost-effective means of transport.

Figure 9 shows the number of mineral exploration licences granted annually since 1994. Since 2000, there has been an increase in the number of exploration licences granted for mineral sands. In the last five years of the previous century (1994-95 – 1998-99), only 10 exploration licences were granted. In comparison, during the past 10 years, an average 11 licences were granted each year.

**Figure 9: Mineral sands exploration licences granted in Victoria<sup>25</sup>**



Significant deposits of mineral sands were first discovered in the early 1980s; however, these fine grained mineral sands are not amenable to conventional processing approaches, so development has awaited depletion of good grade coarse grained resources.

The Victorian Murray Basin contains more than 60 million tonnes of coarse grained mineral sand deposits and more than 3 billion tonnes of fine grained deposits. DPI analysis indicates that Victoria's identified resources alone are sufficient to supply 25 years of current world production of chloride titanium feedstock and 20 years for zircon.<sup>26</sup> Analysis indicates Victoria's mineral sands resources have the right combination of resource size, grade and mineral assemblage to compete in growing global markets, assuming that commodity prices remain at levels that allow development to be economically viable.

Global commodity prices of rutile and zircon have both increased in recent years, making mineral sands production a more attractive industry. Increases in demand for both these products are anticipated. The conditions appear to be in place to encourage mining companies to enter the market. There is potential for significant growth in mineral sands production given the untapped deposits existing in Victoria.

The significant deposits of mineral sands that have been discovered in Victoria have not, to date, been developed beyond the three Iluka mines in the Murray Basin area. The fine-

<sup>25</sup> Australian Bureau of Statistics 2010, *Mineral and Petroleum Exploration Australia*, cat. no. 8412.0., ABS, Canberra.

<sup>26</sup> DPI 2011, *Discovery – Victoria's earth resources journal*, September, Melbourne, p. 8.

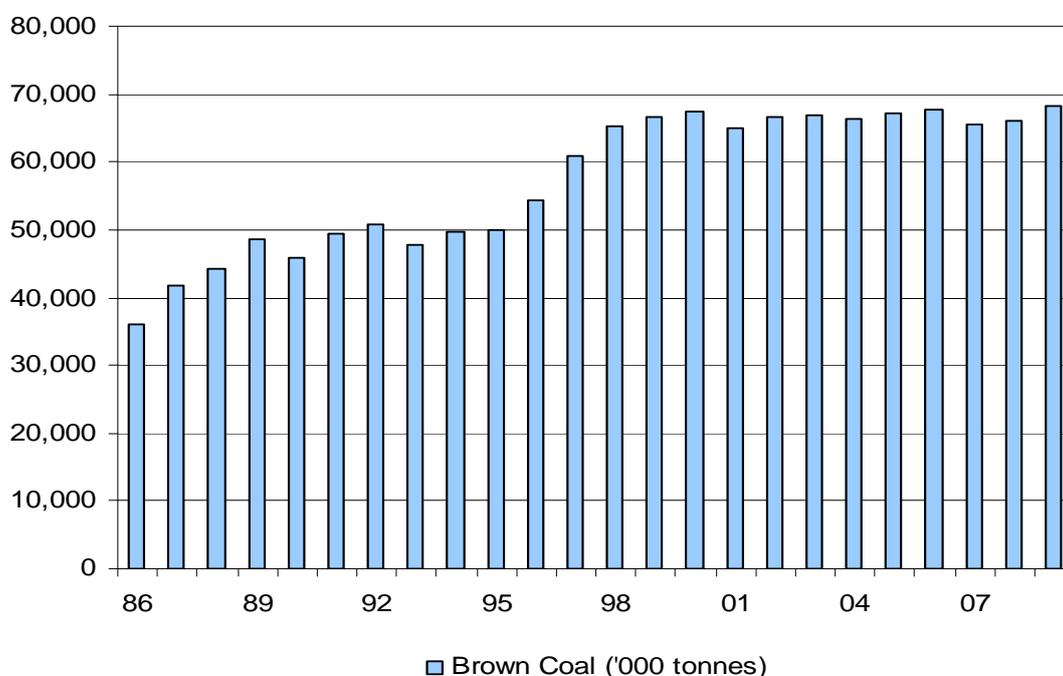
grained minerals sands found in the deposits differ from the coarse grained sands currently being mined and require different processing technologies. These technologies are essential for exploiting the reserves and developing the long life mining operations.

### Brown coal

Victoria has relied heavily on brown coal to supply the state with secure and competitive energy for nearly a century. This has been a source of competitive advantage that has delivered social and economic benefits to all Victorians. The state's use of brown coal for electricity generation has been driven by its abundance and accessibility. The vast majority of low cost brown coal is located in the Latrobe Valley. This led to the development of our stationary energy system – based on the centralised, large scale generation of power – close to the brown coal resource. The transmission network was built to efficiently transport electricity from the power stations to large metropolitan centres. A critical mass of industry and infrastructure has arisen in the Latrobe Valley.

Brown coal production in Victoria is shown in Figure 10. Brown coal production has not grown since 1998 following construction and expansion of Loy Yang B by the government. Production was recorded at 69 million tonnes in 2009.

Figure 10. Brown coal production ('000 tonnes), Victoria<sup>27</sup>



Depending on inclusions and economic conditions, the state has an estimated potential economic brown coal resource of up to 60 billion tonnes in the Latrobe Valley. This would be equivalent to around 500 years of supply at current production levels. Coal located within an exemption area containing the former holdings of the State Electricity Commission of Victoria, is under government control and considered to be of significant value to the state and is therefore not subject to the usual 'first come, first served' allocation process set out in the MRSDA.

The export of treated brown coal and derivative products is currently not commercially viable, at scale, because of a range of factors, reflecting the low value of the coal and technological constraints.

The combustion of brown coal to produce power currently produces higher greenhouse gas emissions than other existing and potential power generation methods. The long term future

<sup>27</sup> DPI 2011, *2009-10 Statistical Review – Victoria's Mineral, Petroleum and Extractive Industries*, East Melbourne, p. 30.

for conversion of brown coal to power will rely on technologies to reduce emissions, given the Commonwealth abatement targets.

The potential introduction of a national carbon price that increases over time will also make conventional brown coal electricity generation progressively less competitive. The older, least efficient brown coal power stations will become less commercially competitive and reduce output as the carbon price rises. Sufficient new capacity needs to be introduced in a timely way to replace any retiring plants and avoid disruptions to the state's energy supply. The extent to which Victoria's coal reserves contribute to this new capacity will depend on the ability to develop low emissions coal technologies that are competitive in the national carbon constrained environment.

Low emissions coal technologies commonly refer to the various approaches used to reduce emissions from coal powered electricity generation. These technologies include:

- coal drying – reducing the moisture content and designing equipment for burning brown coal at these lower moisture contents. This can reduce carbon emissions by around 10 per cent.
- coal gasification – a technology that dries and gasifies brown coal in an integrated process and generates electricity using combustible gases, including hydrogen, from the gas produced.
- carbon capture and storage – a technology that involves capturing the carbon produced at large industrial plants, transporting it to a suitable storage site, and storing the carbon securely and permanently underground (or alternative approaches such as enhanced soil carbon).

None of these technologies is currently operating at scale in Victoria but extensive work is underway to assess commercial viability. An example of such work is the Integrated Drying Gasification Combined Cycle, which has undergone extensive research and development and is planned for use in a large scale demonstration plant in Victoria. This plant is designed to prove both the drying and gasification of brown coal can be commercially undertaken.

Other research and development proposals have looked at investigating the commercial potential for drying coal. These new technologies are in various states of development and require further investigation to determine their commercial viability. Drying technologies are likely to be a prerequisite for the future development of treated brown coal and derivative products. Alternative uses of the brown coal resource will require technology developments that are in addition to the commercialisation of drying technologies.

### **Victoria's crude oil resources**

Victoria continues to produce a significant amount of oil, with the Gippsland Basin accounting for 18 per cent of Australia's crude oil production in 2007-08<sup>28</sup>; however, oil production levels have steadily declined over the past 10 years and Victoria is now a net importer of oil.<sup>29</sup> Further exploration for undiscovered reserves, which are estimated to be significant, is required.<sup>30</sup> It is uncertain whether current and projected future oil prices will provide adequate incentives for the private sector to conduct such exploration. This downward trend appears likely to continue without a significant new discovery (which is currently not anticipated to occur).

Oil production peaked at approximately 166 million barrels in 1985 (see Figure 11). Crude oil and condensate production fell to some 27 million barrels in 2009 (approximately 83.5 per cent). This decline is a result of depletion of the reservoirs due to production. The production of liquefied petroleum gas has steadily fallen by some nine million barrels or 46 per cent between 1984-85 and 2008-09.

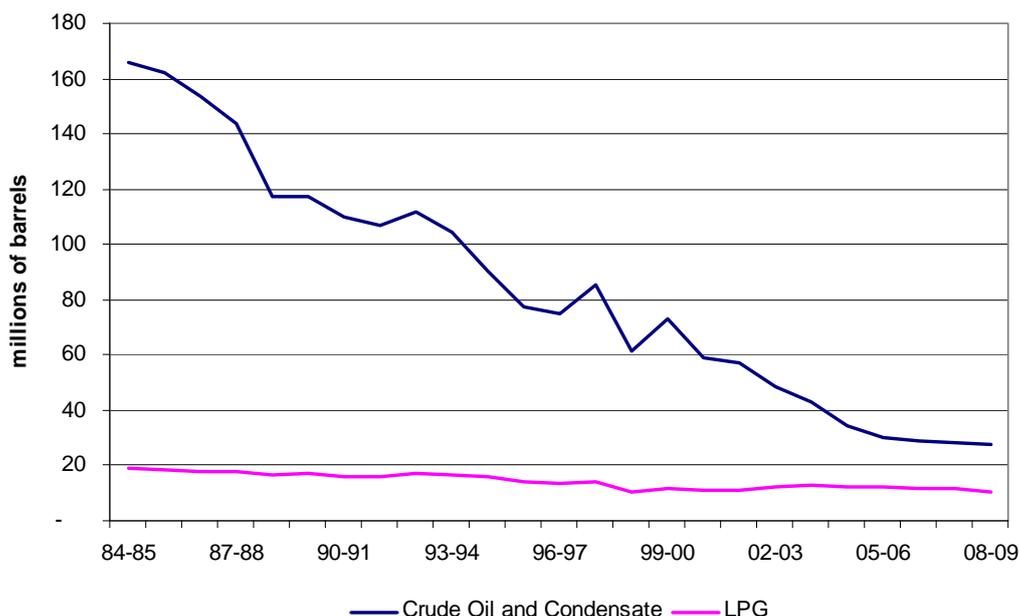
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<sup>28</sup> ABARE 2010, *Australian Energy Resource Assessment*, Canberra, p. 60.

<sup>29</sup> DPI 2010, *Victorian Minerals & Petroleum (Mining) and Energy Industries – At a Glance 2009*, East Melbourne, p. 8.

<sup>30</sup> DPI, <http://new.dpi.vic.gov.au/earth-resources/oil-gas/victorias-petroleum-industry-an-overview>

**Figure 11. Gippsland annual crude oil and condensate and liquefied petroleum gas production (Bass Strait annual petroleum production), in millions of barrels<sup>31</sup>**



An increasing reliance on crude oil imports may increase Victorian and national exposure to global conditions. Access to international markets means there is a diversified supply base; however, a Commonwealth government assessment of energy security has also noted that 'the longer term outlook for liquid fuel security will see increasing reliance on difficult geographic and geopolitical regions. This may result in price volatility'.<sup>32</sup>

### Gold and base metals

Most of the gold in Victoria was produced between 1852 and 1915, when annual production varied between a maximum of 90 tonnes in 1856 and a minimum of 10 tonnes in 1915. Gold production had declined to less than 100 kilograms per year by the late 1970s, but then increased to more than three tonnes per year in 1990.

Since 2004, gold production in Victoria, as shown in Figure 12, has generally increased because mining recommenced at Fosterville, then Bendigo and Costerfield then Ballarat East. It did decline, however, in 2007 and 2008 when production fell at the Fosterville and Bendigo mines. Gold production decreased in 2010 despite record gold prices because of reduced production at Stawell and Bendigo and closure of the Ballarat East mine.

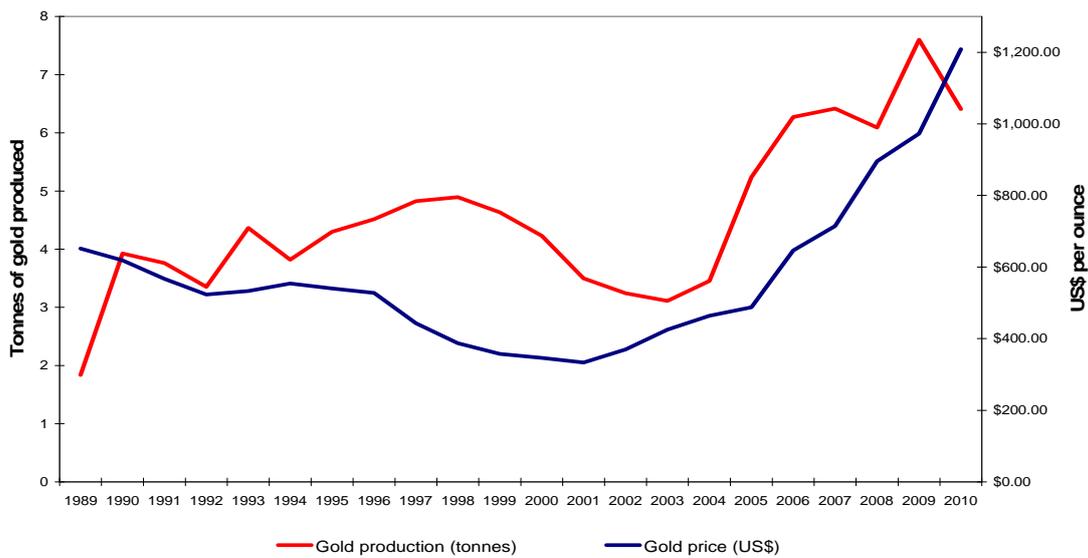
There are currently two medium-scale producing gold mines at Stawell and Fosterville in Victoria. There is also some gold production at Costerfield. Other mines being redeveloped are the Ballarat East Mine, Morning Star mine at Woods Point and the A1 gold mine north of Woods Point.

Gold is a key driver of mineral exploration worldwide. Gold exploration has accounted for 48 per cent of global exploration budgets for nonferrous metals over the last 20 years. This is also paralleled in exploration expenditure and the granting of exploration licences in Victoria's earth resources sector.

<sup>31</sup> DPI (2010), *2008/09 Statistical Review - Victoria's Mineral, Petroleum and Extractive Industries*, p. 10.

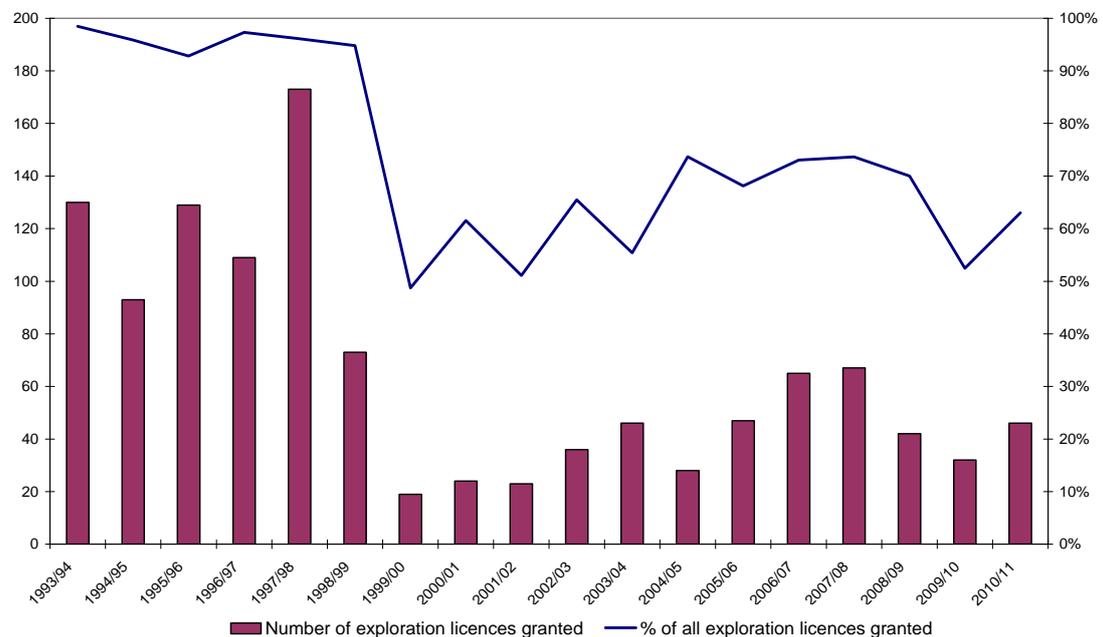
<sup>32</sup> Department of Resources, Energy and Tourism 2009, *National Energy Security Assessment*, Canberra, p. 10.

Figure 12: Victoria's gold production and gold price 1989 to 2010<sup>33</sup>



The pattern for gold exploration licences granted is closely linked to the overall pattern for exploration licences, as shown in Figure 13. This linkage is mainly because gold dominates exploration activity in the state. Gold has declined as a proportion of all licences granted, reflecting both a decline in overall exploration activity and greater diversity in the exploration portfolio.

Figure 13: Total number of precious metal exploration licences granted and as a proportion of all exploration licences granted, Victoria



The drop in the number of exploration licences granted over the past 10 years may be because much of Victoria's gold lies well below the surface and therefore, is difficult to access and has an unreliable distribution in the ground. Victoria's gold production is now dominated by a smaller subset of more reliable disseminated resources.<sup>34</sup> Opportunities in other states

<sup>33</sup> ABARES 2011, Canberra.

<sup>34</sup> This includes the state's two largest, active gold mines; Fosterville and Stawell

and countries may present explorers with easier to find deposits, attracting them away from Victoria.

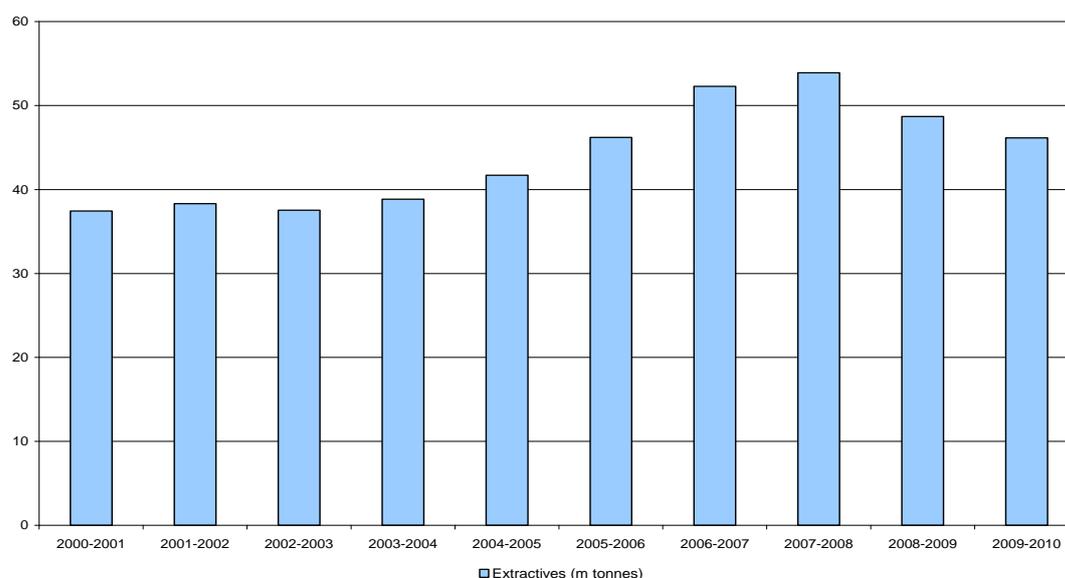
Victoria currently has no significant production of base metals, such as copper, lead, zinc and nickel. At present, the only significant base metal mine in Victoria is the Wilga copper mine near Benambra in the northeast of the state.

Deposits of base metals are known throughout the state and prospectivity in the state's northwest is particularly strong.<sup>35</sup> Opportunities based on these deposits may arise in the future, subject to successful exploration activity, leading to increased mining of base metals and disseminated gold.

### Extractive resources

Extractive industries provide the raw materials for building and construction, which is vital to the state's development. The industry operates quarries that produce a range of hard rock, clay, sand and gravel. These commodities are generally a high volume, low value product (dimension stone is an exception which is used in the construction and monument industries). Extractive commodities are used in a range of items, including concrete, concrete products, bricks, pavers and roofing tiles. Such items are needed for construction and building, both for residential, public and commercial buildings and for public infrastructure. Production figures for the industry fluctuate significantly according to economic circumstances as shown in Figure 14.<sup>36</sup>

Figure 14. Extractive industry, production: 2000-01 to 2009-10, Victoria<sup>37</sup>



There are 869 quarries operating under the MRSDA in Victoria. This number has remained relatively stable since 2001-02. In 2009-10, 605 of these reported a total production of 46.1 million tonnes. This is lower than the previous production of 48.7 million tonnes in 2008-09. The reported decreased production reflects lower demand for extractive materials in the year.

Extractive resources are generally not scarce. Extractive businesses are able, to some extent, to choose a location to maximise profits, unlike more scarce mineral resources. Quarries tend to locate close to consumer markets to minimise transport costs. This close proximity to urban areas can lead to conflict with local residents. If quarries are required to move further away

<sup>35</sup> More information can be found on this site: <http://new.dpi.vic.gov.au/earth-resources/minerals/metals>

<sup>36</sup> Olshina et al 2003, *Melbourne Supply Area – Extractive Industry Interest Areas Review*, Geological Survey of Victoria Technical Record 2003/2, East Melbourne, p. 10.

<sup>37</sup> DPI 2011, *2009-10 Statistical Review – Victoria's Mineral, Petroleum and Extractive Industries*, East Melbourne, p. 33.

from the centre of their consumer markets due to urban area expansion, this will lead to increasing transportation and construction costs.

### **Geothermal energy**

Geothermal energy uses the heat generated by rocks or water bodies deep underground and can be converted into electricity, or can be used directly to heat buildings or for industrial purposes. One of the advantages of geothermal energy is its potential ability to provide a continuous and controllable supply of baseload energy more cheaply than other sources of renewable energy<sup>38</sup>.

Geothermal energy is still relatively unexplored in Victoria, although it has been used for small scale purposes, such as heat pumps for industry, for decades. Victoria appears to have an abundance of high-heat producing basement rocks buried beneath sediments; however, the economic circumstances for accessing this type of geothermal energy do not currently exist.

Information confirming the potential of Victoria's geothermal resources is limited. Exploration can be expensive and difficult because the geothermal resource is found deep underground. Further activity is necessary to determine how to consistently and efficiently transfer heat from hot dry rocks and hot aquifer rocks. The success of geothermal as an alternative energy resource will be determined through a greater understanding of the size and properties of the resource and through emerging new technologies that can economically access it.

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<sup>38</sup> Electric Power Research Institute (EPRI), 2009, Australian Electricity Generation Technology Costs – Reference Case 2010, California, p.10-5.

## 6. Regulatory processes and approvals

The following chapter reviews the regulatory processes in Victoria for both exploration and mining.

### Key points:

- Victoria's mineral and extractive resources are regulated under the MRSDA.
- Assessments, approvals or consents are also required under other state and Commonwealth regulation, including the *Environment Effects Act 1978*, Victoria's Native Vegetation Management: A Framework for Action and the *Water Act 1989*.
- The MRSDA covers the regulatory processes for exploration and mining licences. The *Mineral Resources (Sustainable Development) Amendment Act 2010* (the Amendment Act) has introduced the retention licence to ensure licences are actively worked and provide increased security of tenure for licence holders.

### 6.1. Regulatory processes for exploration and mining

The principal piece of legislation under which Victoria's mining and extractive industries, including exploration, are regulated is the MRSDA. The aim of the MRSDA is to encourage an economically viable mining industry which makes the best use of mineral resources in a way that is compatible with the economic, social and environmental objectives of the state.

Victoria's earth resources regulation specifically requires that approvals and consents under other state and Commonwealth regulation be obtained before a work authorisation will be granted. Consultation with the community and stakeholders is also usually required. Such processes are intended to improve the transparency and outcomes of decision-making.

Victoria's earth resources sector is subject to a broader regulatory framework. In addition to specific earth resources and planning regulation, Victorian and Commonwealth regulation also applies to the following:

- environment – environmental impacts may require assessment under legislation such as the *Environment Protection and Biodiversity Conservation Act (Cth) 1999* (EPBC Act), the *Environment Effects Act 1978 (EE Act)*, the native vegetation management framework and the *Water Act 1989*
- Aboriginal heritage and Native Title – cultural heritage management plans may be required under the *Aboriginal Heritage Act 2006*. Prior to mining, the licensee is required to have addressed all native title matters in accordance with the *Commonwealth Native Title Act 1993*.
- occupational health and safety – the *Occupational Health and Safety Act 2004* applies to firms operating in Victoria's earth resources sector.

Local government regulation also applies via local planning schemes.

#### Regulatory process for exploration licences

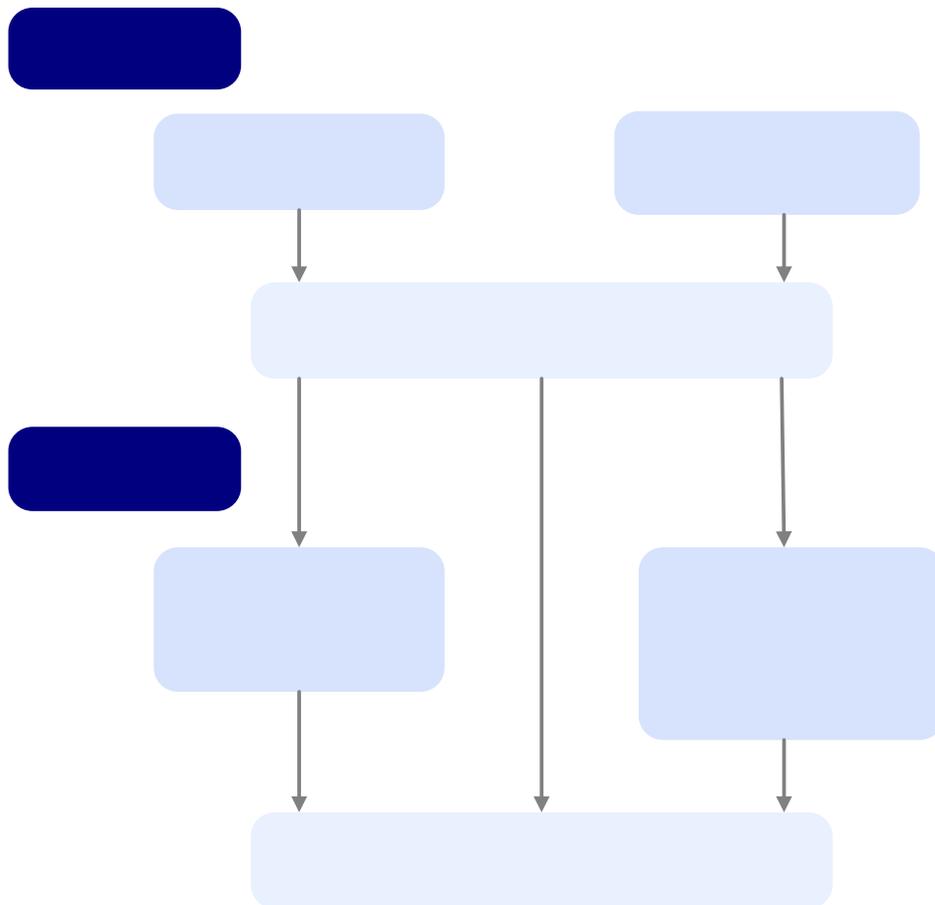
An exploration licence under the MRSDA must be obtained to undertake exploration. Mineral exploration includes conducting geological, geophysical and geochemical surveys; drilling; collecting samples for analysis; the non-commercial extraction of minerals; and anything (other than mining) specified by an exploration licence.

The holder of an exploration licence is entitled to carry out exploration on the land covered by the exploration licence. An exploration licence can cover an area of up to 500 sq. km. The term of an exploration licence is up to five years, with renewal available under the current legislation. Information about imminent changes to exploration licences is outlined in section 7.2.

Exploration under a licence cannot be undertaken until there is a rehabilitation bond, public liability insurance is in place, and all necessary consents and authorities are obtained. A work plan must also be approved by DPI before work commences. This does not apply to low impact exploration, which is typically exploration activity such as geological surveys and mapping, small-scale soil and rock sampling and some geophysical surveys.

The process for obtaining an exploration licence is shown in Figure 15 below. A more detailed process map is set out in Appendix A.

Figure 15. Victoria's two step process for exploration and mining approvals<sup>39</sup>



### Regulatory process for mining licences

The MRSDA established a multi-stage approval process for obtaining a mining licence and an authority to commence work.

The first stage involves the Minister granting a mining licence. The licence confers mineral rights from the Crown to the licence holder (licensee) but does not give the licensee authority to carry out mining operations.

#### Typical features of a mining licence

- A term of up to 20 years.
- Payment of licensing fees (tenement rents).
- Payment of royalty in respect of production (except for gold).
- Minimum expenditure levels.
- Submission of mine work plans for approval.
- Periodic reporting on activity and data to administering authority.

<sup>39</sup> DPI 2009, *Review of the Mineral Resources (Sustainable Development) Act 1990*, Melbourne, p. 33.

- *Environment assessment, protection and rehabilitation obligations (including a bond), under both earth resources legislation and other Victorian and Commonwealth legislation.*

The second stage requires the licensee to complete approvals and consents to obtain a work authorisation. These include:

- a work plan (which includes a rehabilitation plan and a community engagement plan) approved by DPI
- a rehabilitation bond is lodged
- public liability insurance is in place
- planning approval is obtained
- other relevant consents and approvals are obtained (for example, landowner consents, native vegetation, environment or a licence to take and use water).

Any owners or occupiers of land must also be notified of the intention to commence work on a mining licence. The permission to start work on a mining licence will only be granted once the licensee has obtained the written consent of the landholder or has made and registered a compensation agreement with the landholder. Compensation provisions apply only where landholders suffer loss or damage as a result of work on a licence or as a consequence of the approved work plan.

Once all requirements are satisfied, the work authority is granted by DPI and mining can commence.

### **Work plan and planning approval processes**

The draft work plan covers the detail of onsite works associated with the mining operation and subsequent rehabilitation of the land. It also outlines the operation's community engagement plan. A work plan is currently not approved by DPI until either any necessary planning permit has been obtained or a required Environment Effects Statement (EES) process has been completed. A planning permit is not required if the EES process has been successfully completed. These two processes are set out in Appendix B.

The draft work plan must be prepared in consultation with DPI and other relevant departments. Currently, DPI endorses a draft work plan when all departments are satisfied that the plan meets appropriate standards for content and technical accuracy, and is satisfactory for submission with the planning permit application. Information about imminent changes to the endorsement process is outlined in section 7.2. The Amendment Act will introduce statutory endorsement of work plans from January 2012.

### **Environment Effects Act 1978**

*Where development of a greenfields project is likely to result in significant impacts to the environment, the project may at be required to be assessed under the EE Act prior to commencing works. The Minister for Planning is the Minister responsible for the act, while the Department of Planning and Community Development (DPCD) administers its procedures.*

*The EE Act establishes a legislative framework for assessing the likely environmental effects of proposed works. The primary purpose of the EE Act is to deal with works that could have a significant effect on the 'environment' which is defined broadly under Ministerial Guidelines to include the physical, biological, heritage, cultural, social, health, safety and economic aspects of human surroundings, including the wider ecological and physical systems within which humans live.<sup>40</sup> More specifically, the EE Act may be applied to works for which the proponent or a relevant decision-maker seeks the Minister's advice (s.8) and the Minister then determines that the Act is to apply (s.8B(3)).<sup>41</sup>*

<sup>40</sup> Department of Sustainability and Environment 2006, *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978*, Melbourne, p. 2.

<sup>41</sup> Or other person or body authorised under an Act or law to make a decision with respect to the works.

*The Minister may require an EES documenting the environmental effects of the works to be prepared by the proponent and assessed by the Minister before relevant decisions (approvals) relating to the works can be made (s. 8C(1)). In the case of greenfields projects the EES would need to be assessed prior to the approval of a work plan, and/or grant of a work authority.*

*Where assessment of a mining proposal is required under the EE Act, agreed inter-agency coordination arrangements come into play. Memoranda of understanding between the DPCD (which administers the EES process) with the DPI, the Department of Sustainability and Environment (DSE) and the Environment Protection Authority – provide for coordination of the assessment process with approval processes under the MRSDA, Victoria's Native Vegetation Management: A Framework for Action, the Environment Protection Act 1970, and potentially other applicable statutory provisions.*

*The Minister for Planning and DPCD administer the bilateral agreement between the Victorian and the Commonwealth Governments with respect to the application of the EPBC Act to projects. The EES process is accredited under this bilateral agreement and may be applied to mining projects that are subject to the EPBC Act.*

Where an EES has been previously prepared and a variation to an approved work plan is subsequently sought, no further environment effects assessment is required if the Minister is satisfied that there are no significant additional environmental impacts or the Minister for Planning assesses the impacts and the variation substantially complies with the requirements recommended by that assessment.

### **Native vegetation framework**

*Victoria's Native Vegetation Management: A Framework for Action* was released in 2002. The primary goal for native vegetation management is a reversal across the entire landscape of the long-term decline in the extent and quality of native vegetation.<sup>42</sup> The framework applies to all earth resources industry activity that will cause the removal, destruction or lopping of native vegetation. As such, the framework is relevant to any exploration and mining activities.

Net gain is the outcome for native vegetation and habitat where overall gains are greater than overall losses, and where individual losses are avoided where possible. Net gain accounts for three types of contributions:

- improvements in the quality and extent of native vegetation achieved through government investment and voluntary measures.
- no net loss of native vegetation for permitted clearing. The three-step approach of avoid, minimise and offset is key to achieving this aim.
- losses in the quality and extent of native vegetation arising from clearing that does not require a permit, and from other processes (for example, tree dieback) and practices (for example, permitted land uses).

The three step approach is:

- Step 1: Avoid adverse impacts, particularly through vegetation clearance.
- Step 2: If impacts cannot be avoided, minimise impacts through appropriate consideration in planning processes and expert input to project design or management.
- Step 3: Identify appropriate offsets for vegetation loss.

Where native vegetation is cleared, the applicant for either an exploration or mining licence must prepare an offset management plan in consultation with responsible government agencies (including DPI and DSE). The applicant must identify what is being offset, where it is being offset, how it is being offset and when it will be offset. The purpose of the plan is to document the connection between the native vegetation losses, the net gain requirements

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<sup>42</sup> Department of Natural Resources and Environment 2002, *Victoria's Native Vegetation Management: A framework for Action*, Victoria, p. 14.

and the proposed gains. Gains must be achieved within 10 years and the management plans must include how the gains will be maintained on an ongoing basis.<sup>43</sup>

### **Groundwater access**

Groundwater is the reserve of water located beneath the earth's surface in pores and crevices of rocks and soil.<sup>44</sup> These areas vary in size and volume throughout Victoria and are known as aquifers.<sup>45</sup> Groundwater is an important part of the environment and also complements surface water supplies.

Groundwater is used for agricultural, earth resources and domestic purposes. The quality of the groundwater (for example, fresh or brackish) affects how it is used. The earth resources sector uses groundwater in processing, dewatering and re-injecting. Groundwater is a valuable resource for earth resource activities; however, groundwater access and management imposes additional operating costs because of the volume of water required.

Access to groundwater is regulated under the *Water Act 1989*. A groundwater licence is required for all groundwater extraction (other than for stock and domestic purposes). Groundwater licences are issued to protect the rights of licence holders, to ensure water is shared amongst users, and to ensure environmental requirements are protected.<sup>46</sup>

Licences specify annual volumes of groundwater that can be pumped and the rate of pumping.<sup>47</sup> The number of licences in any given area is constrained by the permissible consumptive volume (PCV). Where licences have been allocated to the PCV limit, no new licences will be issued, although licences can be traded.

Access may be difficult where few licences are issued because of low volumes of groundwater in an area. Earth resources proponents suggest that establishing or expanding an earth resources industry is more difficult when new licences are unavailable and water licence markets are not yet established.

Enhancements to the Register are improving the information available on potential water users that should make it easier to obtain information about available water for future projects.

### **Community engagement**

The MRSDA requires licensees to consult with the community during all stages of a project, from exploration through to the operational phase and rehabilitation. A duty to consult in this context means that the licensee is required to:

- share information with the community about any activities authorised by the licence that may affect the community
- provide the community with reasonable opportunities to express their views about those activities.

The duty to consult applies throughout the period of the licence and during all stages of a project. This applies to both mining and exploration activities.

The MRSDA also requires that community engagement plans are prepared as part of the work plan and are approved by DPI. The community engagement plan documents the commitments a mining licensee has made to engage with the community. The regulations

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<sup>43</sup> A guide for the earth resources industry on native vegetation management can be found on the DPI website. <http://new.dpi.vic.gov.au/earth-resources/industries/minerals/guidelines/native-vegetation-guide-for-mines-and-quarries>

<sup>44</sup> Department of Sustainability and Environment, *Groundwater*, Retrieved from <http://www.ourwater.vic.gov.au/environment/groundwater>

<sup>45</sup> Department of Sustainability and Environment, *Groundwater*, Retrieved from <http://www.ourwater.vic.gov.au/environment/groundwater>

<sup>46</sup> Department of Sustainability and Environment, *Accessing groundwater*, Retrieved from <http://www.ourwater.vic.gov.au/environment/groundwater/access>

<sup>47</sup> Department of Sustainability and Environment 2009, *Groundwater licensing and trading in Victoria for earth resource industries*, [http://www.ourwater.vic.gov.au/\\_\\_data/assets/pdf\\_file/0017/54413/Groundwater-Licensing-Trading-fact-sheet-2.pdf](http://www.ourwater.vic.gov.au/__data/assets/pdf_file/0017/54413/Groundwater-Licensing-Trading-fact-sheet-2.pdf)

stipulate the minimum requirements that are to be included in a community engagement plan. Together, these measures aim to increase engagement opportunities between miners and the communities in which they work.

On commencement of activity, licensees are also obliged to:

- minimise interference with regular landholder activities on the land
- follow public safety and environment planning regulations
- maintain in good condition and repair all structures, equipment and property used in connection with minerals exploration and mining operations
- continue consultation with the local community for the duration of the operation (from exploration through to development, operation, closure and rehabilitation).

## **6.2. Changes to regulatory processes**

A review of the MRSDA commenced in April 2009. The review is being undertaken in two phases, with the first phase culminating in the Amendment Act.

Due to Victoria's size and high population density, it is important that regulation supports the active working of licences and effective and efficient land use. The amendments will ensure that Victoria has a licensing system that encourages the development of the state's mineral resources.<sup>48</sup> Amendments will also align government processes with industry processes, thereby providing the basis for requiring appropriate activity and monitoring across development stages.

The second phase of the review will look at the authorisation of work and government approvals processes which are issues of greater complexity.

Changes to broader environmental regulation applying to earth resources are also proposed.

### **MRSDA review phase 1**

The Amendment Act, scheduled to come into operation by February 2012, will reform and modernise Victoria's licensing arrangements for the minerals and extractives sectors. New licensing arrangements are centred on introducing a retention licence, including complementary requirements to ensure licences are actively worked. The new system will provide increased security of tenure for licence holders with an identified mineral resource and will encourage the development of the state's mineral resources by requiring land that is not being actively worked to be relinquished.

The retention licence can be applied for where a mineral resource has been identified but the resource is not yet confirmed as commercially viable to mine although may reasonably be expected to become so in the future. The retention licence will maintain rights to a mineral resource while pre-feasibility assessments are undertaken and commercial viability is being established.

Once commercial viability of a project is established, licensees will not be permitted to remain on a retention licence but will need to progress to a mining licence. If pre-feasibility assessments indicate that a project or mineral resource is not commercially viable, licensees will not be permitted to remain on a retention licence.

The new retention licence will provide for secure tenure over an identified mineral resource in the absence of mining. Consequently, a mining licence will only be granted when mining is imminent. The granting of a new mining licence and renewal of an existing mining licence (unless mining is currently taking place) will occur only where a mineral resource has been identified and where prefeasibility assessments indicate that a mineral resource is commercially viable. This will reduce the number of existing mining licences that do not have an identified mineral resource or a demonstrated intent to develop the resource.

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<sup>48</sup>Victorian Parliamentary Debates, Legislative Assembly, 28 July 2010, p. 2760.

In addition, the terms of an exploration licence will be modified:

- The current term of an exploration licence is up to five years, with renewals available. The Amendment Act provides that, following the initial grant of a licence for up to five years, one renewal of up to five years is allowed. A second renewal of up to five years may also be given, but only where the Minister considers there are exceptional circumstances and where it can be demonstrated that there is likelihood of the licensee identifying a mineral resource in the term of the renewal.
- The amendments also provide additional relinquishment requirements for exploration licences at the end of years seven and 10 of the license. The relinquishments reduce the land size of the exploration license progressively over the lifetime of the license. The impact of imposing a limit on the number of renewals and increased relinquishment requirements is mitigated by the introduction of the retention licence.

A non-licensing amendment under the Amendment Act is the introduction of statutory, rather than the current non-statutory, endorsement of work plans. Under the current system, the work plan may be agreed by the DPI and then resubmitted when the applicant is seeking a planning permit. To avoid duplication of endorsement at this stage, introducing the statutory endorsement when the work plan is initially submitted means that no further authorisations will be required for the work plan.

### **MRSDA review phase 2**

The second phase of the review is currently nearing the end of the consultation process, with reform proposals being developed for circulation, prior to the implementation of the reforms. This phase of the review generally focuses on work authorisation in the mineral and extractive industries and maintaining efficient and effective regulation of the sector. It intends to streamline the work approvals process, reduce delays in approvals and reduce the costs of any unnecessary regulatory burden with a view to improving the competitiveness of Victoria as a place to invest. This will be achieved through:

- reducing regulatory and administrative burden associated with the approvals processes for all agencies and legislative requirements while maintaining the integrity and objectives of competing government portfolios
- creating efficiencies to improve the timeliness of the approvals process and actively supporting industry through project approvals where warranted
- introducing risk based regulation where possible for exploration and mining operations and ensuring regulation is 'fit for purpose'
- introducing less prescriptive work plan requirements
- reducing any economic inefficiencies of regulation such as for the administration of rehabilitation bonds

### **Environmental regulation**

On 19 August 2011, the Council of Australian Governments announced the National Reform Agenda for Environmental Regulation, which aims to achieve greater national consistency and streamlining of environmental assessment and approval requirements for major projects. Key intended measures include the development of national standards and increased use of strategic assessment processes and regional environmental plans to reduce the need for project-specific assessments.

On 1 September 2011, the Environment and Natural Resources Committee of the Victorian Parliament handed down a report on its inquiry into the EES process. The report recommends major changes to the legislation for environmental impact assessment, including to prescribe procedures for alternative processes under the EE Act and to provide that the Minister for Planning's assessment would determine the acceptability of a proposal.

## 7. Taxation, fees and charges

This chapter looks at the taxation, royalties, fees and charges that apply to Victoria's earth resources sector.

### Key points:

- The taxation system for minerals in Australia is primarily set by the Commonwealth government. The role that Victoria plays in setting this agenda is limited, particularly given the size of the mining sector in the state, compared to other states and territories.
- Royalties on minerals in Victoria amounted to \$42.1 million in 2008-09, mostly from brown coal.

### 7.1. Taxation

Taxes on the earth resources sector are used by government in as a means of collecting a return on state owned natural resources. The taxation system for minerals in Australia is primarily set by the Commonwealth government through the introduction of the Minerals Resource Rent Tax (MRRT). The role that Victoria plays in setting this agenda is limited, particularly given the size of the mining sector in the state, compared to other states and territories. In Victoria, the MRRT will only have relevance to brown coal; however, existing brown coal projects do not cross the required profit threshold (\$50 million) and are unlikely to attract the tax. Victoria does have the ability to collect royalties on mineral resources within its jurisdiction. No profit based or resource rent taxes are applied to the earth resources sector by the Victorian Government.

### 7.2. Royalties

In Australia, mineral resources in the ground are owned by the Crown. The state, on behalf of the community, transfers exploration and production rights to the private sector which invests in developing these non-renewable resources to generate profits – the difference between the selling price of the resource and the total economic cost of extracting it.

The government collects payments in the form of royalties or taxes, which are designed to capture a portion of the income that firms generate from the earth resources allocated to them. The firm is allocated exclusive exploration and extraction rights in return. Royalties can be output based or profit based. Output based royalties are based on some measure of the size of the resource that is extracted or consumed, while profit based royalties impose a tax on profits or net cash flows.

Victorian royalties are typically based on the volume or value of the resource. In particular three different royalty systems are in place:

- *ad valorem*<sup>49</sup> – most minerals other than brown coal and gold
- rate per unit of weight or volume – quarry products
- rate for energy value – brown coal.

Victorian royalty rates are currently low relative to other jurisdictions. The *ad valorem* rate for minerals other than brown coal and gold is 2.75 per cent of net market value. New South Wales also has a standard *ad valorem* royalty applying to all minerals of four per cent and South Australia applies an *ad valorem* rate of 5 per cent for metallic and energy minerals, ores and concentrates. Western Australia and Queensland have more complex regimes, with rates varying according to products, commodity prices and level of processing. Victoria does not currently have a royalty on gold.

It is difficult to compare royalties arrangements between states because of the complexities in how royalties are administered. For example, South Australia applies a rate of five per cent

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<sup>49</sup> An *ad valorem* charge is calculated as a percentage of net market value set at the time that the commodity is first sold, less any costs associated with the sale such as freight, insurance and marketing expenses.

for metallic and energy minerals, ores and concentrates. It also applies a royalty rate of 3.5 per cent to refined metallic products (including refined copper, gold and silver) and categories of industrial minerals and construction materials. South Australia may also apply a discounted royalty rate of two per cent to eligible mines with a 'new mine status' for five years from the date of the first royalties payment.

Royalties on minerals in Victoria amounted to \$42.1 million in 2008-09, mostly from brown coal. Royalties collected on other minerals have fluctuated over the last 20 years but have matched, in particular, mineral sands production.

### 7.3. Fees and charges

#### Fees and charges

Fees and charges apply for services provided by the government to the Victorian earth resources sector. These are imposed by legislation, such as the MRSDA and the Mineral Resources Development Regulations 2002 and the Mineral Resources (Sustainable Development)(Extractive Industries) Regulations 2010.

The main types of fees and charges for the sector include applications for exploration permits, application for work plans and application for licences to extract earth resources. Table 2 sets out some examples of these fees and charges.

**Table 2: Mining and extractive industries, fees and charges**

Regulation	Value of fee unit (\$) <sup>50</sup>	Fee units	Current fee (\$)	Fee
<i>Mineral Resources Development Regulations 2002. Schedule 19 Item 1 (Reg. 11)</i>	12.22	90	1099.80	<i>Application for exploration permit (minerals)</i>
<i>Mineral Resources (Sustainable Development)(Extractive Industries) Regulations 2010 (Reg. 4)</i>	12.22	31	378.80	<i>Fee for lodging a work plan (extractive industries)</i>
<i>Mineral Resources Development Regulations 2002 Schedule 19 item 2 (Reg. 12)</i>	12.22	40	488.80	<i>Application for mining licence of 5 hectares or less</i>
<i>Mineral Resources Development Regulations 2002 Schedule 19 item 2 (Reg. 12)</i>	12.22	135	1,649.70	<i>Application for mining licence over 5 hectares, per 260 hectares</i>
<i>Mineral Resources Development Regulations 2002 Schedule 19 item 8 (Reg. 28)</i>	12.22	1.5	18.30	<i>Rent for a mining licence (per hectare)</i>

<sup>50</sup> From 1 July 2004, the value of a fee unit for a financial year is fixed by the Treasurer under section 5(3) of the *Monetary Units Act 2004*. The current value is as set in the Government Gazette SG158 on 26 May 2011.

A comparison of fees and charges applied in Victoria to other jurisdictions has not been included in this submission. It is difficult to derive a meaningful comparison because fees and charges are calculated and regulated on a different basis.

### **Rehabilitation bonds**

The other main financial impost relates to securing rehabilitation outcomes through bonds which are imposed by the MRSDA. The holder of an exploration or mining licence or extractive industry work authority is generally required to rehabilitate land in accordance with the rehabilitation requirements of the approved work plan, licence conditions or specific code of practice. The rehabilitation bond is a financial security in the form of a bank guarantee which must be provided by an operator prior to work commencing to ensure that rehabilitation can be undertaken should the operator be unable to meet their rehabilitation obligations.

The rehabilitation liability is based on third party contractor rates to cover the cost of site rehabilitation should the site operator default on their licence requirements. The bond is returned once a company is deemed to have satisfactorily rehabilitated a site according to the rehabilitation plan and intended end use and the company is considered to have discharged its liability for that site.

## 8. Earth resources programs

There are a number of different policy measures and instruments available to government to promote exploration, including the provision of geoscience data and drilling grants. This chapter discusses Victoria's and other's experience of using initiatives to stimulate greenfields mineral exploration.

### Key points:

- Victoria has sought to promote investment in greenfields exploration through geological survey data. Major programs include the Victorian Initiative for Minerals and Petroleum, Developing Gold Undercover and Rediscover Victoria.
- Available evidence suggests that the sector attaches value to the information generated through these programs but it remains unclear whether the provision of this geological survey information has led to increased exploration activity across Victoria.

### 8.1. Past and present initiatives in Victoria

The Government, through the Department of Primary Industries, has provided geoscience data over the past two decades through three key programs:

Victorian Initiative for Minerals and Petroleum (VIMP) – a \$32 million program designed to rejuvenate the Victorian minerals and energy industry by providing explorers with high quality geological information.

Developing Gold Undercover – a \$9 million, three year program to develop new, pre-competitive geoscience data and on-line delivery mechanisms.

Rediscover Victoria – a \$5 million, four year investment to encourage minerals and petroleum exploration in parts of Victoria where little exploration has occurred to date.

The provision of geoscience data aims to acquire new information, upgrade historic data sets or fill data gaps that will assist exploration. Techniques used include airborne geophysical surveying, ground gravity and geochemical surveying, regional mapping and bedrock drilling. Other significant benefits of the provision of high resolution integrated modern geoscience data include:

- catalysed research, remapping and refinement
- leveraged exploration spending
- expedited discovery of new resource deposits
- decreased environmental impacts
- increased sophistication of information systems.

#### Victorian Initiative for Minerals and Petroleum

VIMP was the first concerted pre-competitive geoscience data provision initiative of the Government to aid mineral exploration. It began at a time when the world was learning to appreciate the value of pre-competitive data as a means to stimulate mineral exploration.<sup>51</sup> The program aimed to stimulate mineral and petroleum exploration in Victoria by generating and providing access to geophysical, geological and ground survey data.

There were two components to VIMP, both largely carried out by GeoScience Victoria.

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<sup>51</sup> Duke, J.M. 2010, *Government geoscience to support mineral exploration: public policy rational and impact*, a report prepared for Prospectors and Developers Association of Canada, March.

- The minerals component was designed to promote and aid mineral exploration by providing pre-competitive data and information as an incentive to increase the level of exploration in the state.
- The intent of the petroleum component was to increase the level of petroleum exploration activity in the state. These projects include regional studies and acreage evaluations and maintenance of the seismic and well database by the Energy Geoscience Group.

The key outputs of VIMP were a series of reports providing data, information and analysis on a number of issues relating to the state's geology and mining prospects. A total of 92 reports were produced over the period.

The reports ranged in depth of detail and analysis; some reports present only processed raw data while other reports include a level of data interpretation. The extent to which a report includes data interpretation often depended on availability of resources and funding.

The VIMP program was considered quite successful in terms of geoscience provision, since, at the time of its inception, there had not been much provision of note. The VIMP initiative provided Victoria with the most complete coverage of airborne geophysical survey data, ground gravity data and Geographical Information System (GIS) geological data of any state in Australia.

It is difficult, however, to measure the impact that VIMP may have had on exploration activity in the state, partially because it is difficult to disaggregate the impact of a specific program from the other variables that will affect exploration data. Expenditure on exploration did increase after the inception of VIMP, although it is unclear whether this expenditure was on greenfields activity, or that VIMP was a significant factor in this increase.

### **Developing Gold Undercover**

Developing Gold Undercover was a two-part initiative to attract exploration to the state for potential gold buried undercover through central Victoria. The program continued the work of the VIMP program by investing in new, pre-competitive geoscience data and on line delivery mechanisms. It represented a \$9 million investment in the state and ran from 2006 to 2009.

The two parts of the initiative were as follows:

- Part A: Geoscience – a \$3.5 million investment in new data capture, analysis and resource assessment
- Part B: Information communication technology – a \$5.5 million venture to modernise Department-wide IT architecture and development of the necessary ICT infrastructure to enable better delivery and access to data online.

The principal objective of the program was to provide new geoscience insights and techniques to assist exploration for the potentially large undiscovered gold resources presently concealed under cover.

Major outputs of Developing Gold Undercover include a series of reports and systems in six key thematic areas, each aimed at producing information or information management or delivery systems that will produce increased awareness of opportunities, reduced technical risk and improved access to data.

Developing Gold Undercover appeared to be focussed mainly on companies that were already operating in Victoria, minimising its potential impact to bring new greenfields exploration to the state. The information provided by the program, through the reports and data, was perceived as being interesting by stakeholders; however, there is no evidence that this data led to any additional exploration, given that gold exploration remained subdued through the period of the program.

### **Rediscover Victoria**

This program is the most recent of DPI's earth resources programs. Since 2007, the program will have invested \$5 million over four years through two parts:

- Part A: 3D Victoria – a \$2.5 million program aimed at developing a 3D geological model of Victoria. The program aims to do this by a coordinated approach involving the petroleum exploration industry, the minerals exploration industry, the Cooperative Research Centre for Predictive Mineral Discovery, and the DPI's Developing Gold Undercover initiative.
- Part B: Rediscover Victoria Drilling – a \$2.5 million program of grants that provide funding assistance to encourage innovative drilling programs.

The main objective of the Rediscover Victoria initiative is to encourage earth resources exploration, especially in parts of the state where little exploration has occurred to date and in areas previously seen as either higher risk or having limited prospectivity.

The Rediscover Victoria drilling program provided very little in the way of incentive to drill and, as such, did not particularly encourage any additional exploration. The drilling program has provided a modest amount of money in drilling subsidies; however, some companies felt that the compliance costs and requirements were burdensome and significantly negated the value of the grants.

## 8.2. Programs in other jurisdictions

Australian jurisdictions have their own initiatives in place to assist increases in exploration.<sup>52</sup> The initiatives cover a range of programs, including the provision of geoscience data and collaborative drilling initiatives. For the purposes of this inquiry, this submission will focus on programs in South Australia and Tasmania which were considered relevant to Victoria because of similarities between the jurisdictions and the respective sizes of their sectors.

### South Australia's Plan for Accelerating Exploration

South Australia's *Plan for Accelerating Exploration* (PACE) was intended to develop and improve stocks of the state's geoscientific information. It was also designed to promote South Australia as a destination for mineral and energy investment at a time when South Australia did not have an established global reputation.

The PACE initiative sought to achieve its objectives by undertaking the following activities:

- increasing private mineral exploration expenditure
- improving land access for exploration
- developing new exploration techniques
- facilitating more sustainable regional communities.

The South Australian government committed \$22.5 million for 2004–09 to attract further mineral and petroleum exploration investment. The PACE initiative included funding of \$2 million per year for collaborative drilling over the five years.

The Department of Primary Industries and Resources of South Australia's evaluation of the PACE program indicates that the initiative has been successful in delivering its objectives, including:

- discovering gold deposits
- attracting international interest
- reducing the associated business risk of exploration in the state
- promoting the state's prospects among the exploration community.

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<sup>52</sup> For a list of some of these initiatives, see: Policy Transition Group 2010, *Report to the Australian Government: Minerals and Petroleum Exploration*, Canberra. It should be noted that this is not a comprehensive list of all initiatives being undertaken across Australia.

For the past five years, South Australia has ranked as the number one Australian jurisdiction in the Fraser Institute's Policy Potential Index.

The government is not aware of any independent public evaluations of this program.

#### **Tasmania's TasExplore project**

The TasExplore project was a four-year initiative, starting in November 2006. Key objectives of TasExplore included:

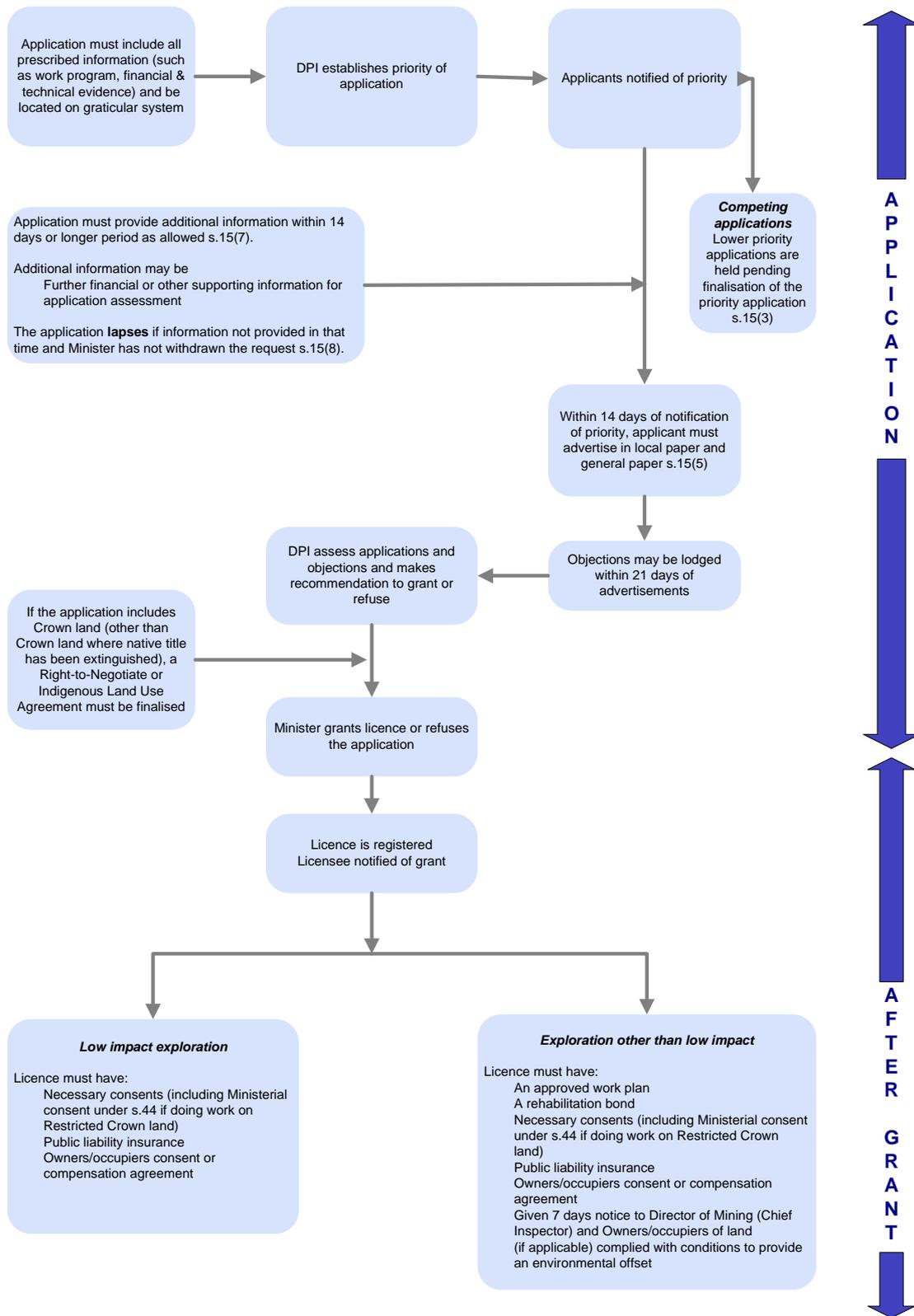
- obtaining new magnetic, radiometric and gravity data for north east Tasmania
- obtaining new geological and structural framework for north east Tasmania
- achieving a better understanding of the controls on mineralisation
- improving geological correlation between west and north west Tasmania
- improving the understanding of genesis and controls on mineralisation in the Arthur Lineament
- advancing geological knowledge of other areas in north west Tasmania.

Similar to South Australia's PACE initiative, a key activity of the program was to promote exploration opportunities and the mineral potential of Tasmania.

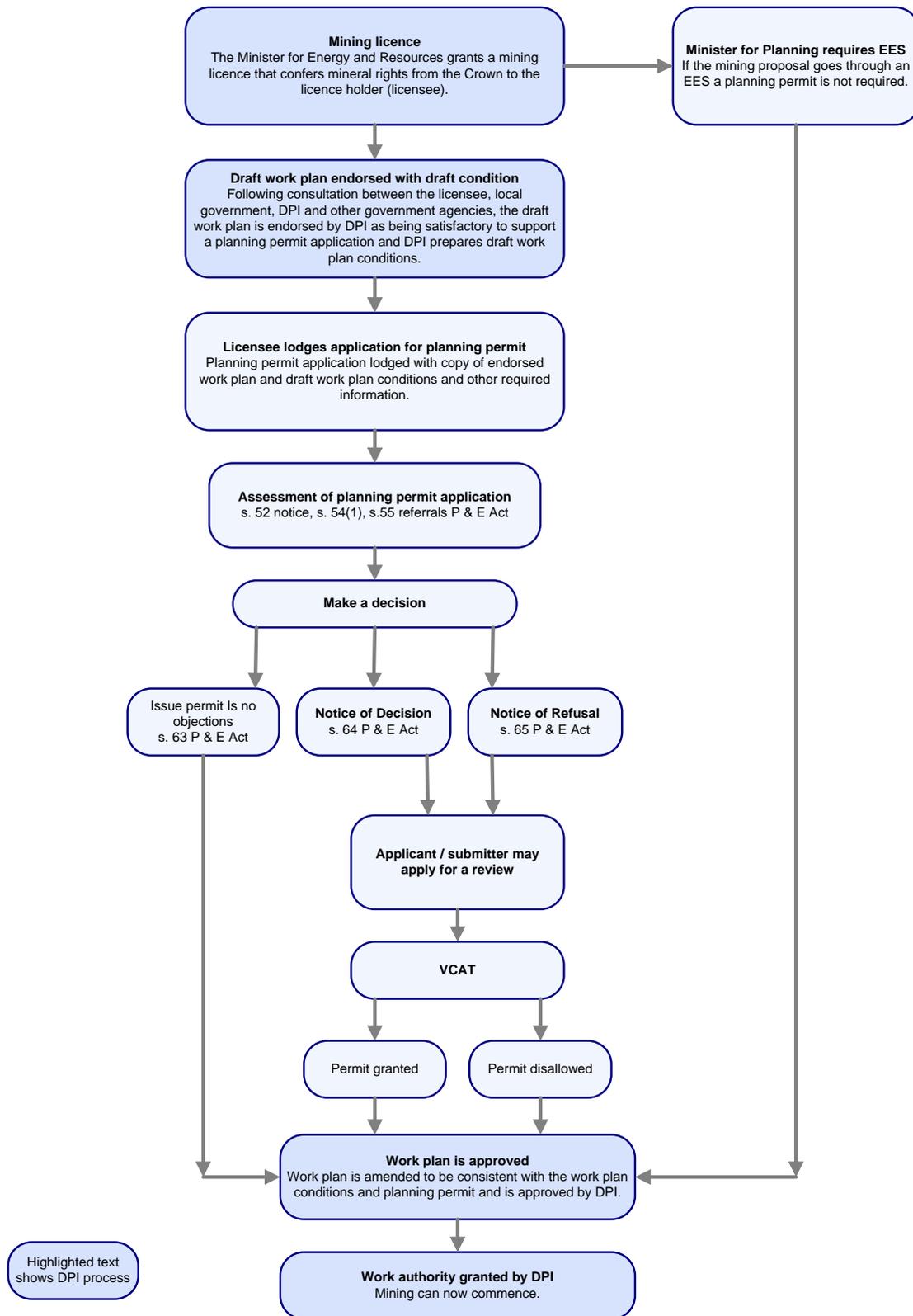
Over the past decade, the Tasmanian and Commonwealth governments have invested over \$16 million in developing new geophysical and geological information in the Tasmanian Information on Geoscience and Exploration Resources database, including 1:25,000 scale digital geological maps of Tasmania's most mineralised regions and a world first 3D geological model and prospectivity analysis of the entire state.

The government is not aware of any independent public evaluations of this program.

# Appendix A: Exploration licence process



## Appendix B: Approvals process for mining



# Acronyms

<b>ABARE</b>	Australian Bureau of Agricultural and Resource Economics and Sciences
<b>DPI</b>	Department of Primary Industries
<b>DPC</b>	Department of Premier and Cabinet
<b>DPCD</b>	Department of Planning and Community Development
<b>DSE</b>	Department of Sustainability and Environment
<b>EES</b>	Environment Effects Statement
<b>GFC</b>	Global Financial Crisis
<b>GSP</b>	Gross State Product
<b>GSV</b>	GeoScience Victoria
<b>GVA</b>	Gross Value Added
<b>LPG</b>	Liquefied petroleum gas
<b>MEG</b>	Minerals Economic Group
<b>mmcf/d</b>	Million cubic feet per day
<b>MRRT</b>	Minerals Resource Rent Tax
<b>PACE</b>	Plan for Accelerating Exploration
<b>PCV</b>	Permissible consumptive volume
<b>PTG</b>	Policy Transition Group
<b>Tcf</b>	Trillion cubic feet
<b>VIMP</b>	Victorian Initiative for Minerals and Petroleum
<b>LEGISLATION</b>	
<b>EE Act</b>	Environment Effects Act 1978
<b>EPBC</b>	Environment Protection and Biodiversity Conservation Act (Cth) 1999
<b>MRSDA</b>	Mineral Resources (Sustainable Development) Act 1990

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