ENERGY

The Minister for Minerals and Energy of the State of Victoria is responsible for the administration of the following Acts of Parliament: Coal Mines Act 1958; Electric Light and Power Act 1958; Extractive Industries Act 1966; Gas Act 1969; Gas and Fuel Corporation Act 1958; Gas Franchises Act 1970; Groundwater Act 1969; Liquified Petroleum Gas Subsidy Act 1980; Minerals and Energy Act 1976; Mines Act 1958; Mines (Aluminium Agreement) Act 1961; Mining Development Act 1958; Nuclear Activities (Prohibitions) Act 1983; Petroleum Act 1958; Petroleum (Submerged Lands) Act 1982; Pipelines Act 1967; State Coal Mine Industrial Tribunal Act 1932; State Coal Mines (Winding Up) Act 1968; State Electricity Commission Act 1958; Underseas Mineral Resources Act 1963; Victorian Brown Coal Council Act 1978; and the Victorian Solar Energy Council Act 1980.

Subject to the Minister, the Department of Minerals and Energy, the State Electricity Commission of Victoria, the Gas and Fuel Corporation of Victoria, the Victorian Brown Coal Council, and the Victorian Solar Energy Council are responsible for the administration of these Acts.

Department of Minerals and Energy

The chief purpose of the Department is to provide the Minister with an integrated focus of policy advice and administration across the minerals and energy portfolio.

The Department plans, monitors, co-ordinates, and implements energy policy and delivers energy conservation programmes. The Victorian Government has established a comprehensive energy planning programme which has two major functions. First, the formulation of a series of energy policy statements on specific energy issues which require policy development: draft statements have been released for public comment, and revised statements are being prepared which will constitute the Victorian Energy Plan 1985, a consolidated, major policy overview statement. Second, the programme involves the continuous review, co-ordination, and integration of energy planning within Victorian Government agencies, including integration with the Government's economic, urban, and environmental policies.

Key issues in current energy planning are: to develop and maintain effective and equitable energy pricing policies; to improve the efficiency of portfolio agencies by means of management reforms; to develop new uses, and encourage the most appropriate uses of Victoria's energy resources; to avoid costly over-supply or under-supply of electricity, natural gas, and transport fuels by means of flexible planning strategies and the promotion of more efficient usage; to promote energy conservation; and to develop renewable energy resources such as solar energy, wind power, tidal energy, and fuels produced from biomass and wastes.

A Coal Policy Unit is being established to administer all coal leasing and provide advice on coal policy matters. It is intended that coal leasing and allocation be maintained within a consistent State wide framework of energy policy and resources law.

Two programmes have been developed to promote energy conservation: the Home Energy Advisory Service, and the Government Energy Management Program. The Home Energy Advisory Service has been established as a free service available to householders; at present the service is available in the Melbourne metropolitan area to holders of Commonwealth health cards. For eligible households an assessment is made of the patterns of energy use in the home. This assessment identifies the means by which energy may be saved without any reduction in comfort levels. The Service can provide a grant of up to \$250 for energy saving improvements to a home. The Government Energy Management Program has been set up to promote management of energy in Victorian

Government agencies and in the operation of their transport fleets. Departments and agencies have now established structures for monitoring their energy consumption and are carrying out energy 'audits' as part of this programme. Specific targets have been set to reduce energy consumption by 5 per cent at the end of 1983-84, 7.5 per cent at the end of 1984-85, and 10 per cent at the end of 1985-86.

Energy Information Services has been established to co-ordinate, within the Minerals and Energy portfolio, the production and distribution of literature and information on energy conservation. The Service also operates the Energy Information Centre at 139 Flinders Street, Melbourne, which deals with over 35,000 public inquiries each year. A mobile energy information centre, completed in September 1983, tours country areas and appears at various community events.

The Department conducts geological, groundwater, coal, petroleum, stone, and mineral surveys; produces geological maps; and issues scientific reports. Drilling operations are carried out, and the results are used in sedimentary basin studies and in the evaluation of petroleum, mineral, coal, and groundwater potential. A comprehensive library and a geological museum are maintained; a core library retains cores and cuttings from drilling operations. The administration of petroleum, pipeline, mining, and extractive industry legislation ensures that exploration for, and the production of, minerals and petroleum (both on-shore and off-shore), and quarrying are regulated and controlled. Technical advice is available for mineral exploration and prospecting. Six stamp batteries located at Bendigo, Wedderburn, Maldon, Rutherglen, Mount Egerton, and Bright, provide an ore crushing service to enable test crushings to be carried out at nominal cost. Information is available on mining law and on mining and quarrying statistics. Reclamation of mine-damaged land is undertaken in areas where such action is essential.

Further references: Victorian Year Book 1978, pp.295-7; 1984, pp.252-3

General

Management of energy

Each year Victorians spend billions of dollars on oil, petrol, electricity, and gas. Considerable advertising and public relations budgets have in the past been allocated to promote the sale of energy in its various forms. However, as the price of energy and questions about its continued ready availability have assumed more importance, the Victorian Government has sought means by which supply may be balanced with demand, and the most appropriate use made of the various forms of energy at the State's disposal.

Victoria has huge resources of energy. Beneath relatively shallow layers of overburden throughout a large part of Gippsland are an estimated 31,000 megatonnes of readily available brown coal. At present only about two per cent of this has been used. Beneath the waters of Bass Strait are reserves of gas which should last thirty years at the current level of consumption. Oil reserves there, although probably limited to a life-span of a further twenty-five years, are currently providing 72 per cent of Australia's refinery requirements. Solar energy (and its derivatives) is limited in its usefulness by the technology currently available to harness it, and work is progressing in this field.

An Energy Planning Task Force representing all the agencies of the Minerals and Energy portfolio has been set up to commence building the framework for the Victorian Energy Plan. Other co-ordinating bodies are the Victorian Energy Development Committee, which oversees the Home Energy Advisory Service and co-ordinates all energy information and education services; and the Customer Policy Implementation Committee, which is developing improved and co-ordinated customer policies for the energy utilities, such as providing easier ways for energy customers to pay their gas and electricity accounts.

The Coal Corporation of Victoria is now being formed to absorb the research and development role of the Victorian Brown Coal Council, and the coal development activities of the State Electricity Commission of Victoria.

The *Nuclear Activities (Prohibitions) Act* 1983 prohibits the exploration for and mining of uranium, the establishment of nuclear facilities including power reactors, and the possession of nuclear materials without appropriate licences.

Brown coal

Location

Victoria's largest resources of fossil fuels are the huge deposits of brown coal in the Central Gippsland region, with by far the most valuable and best quality coal being located in the La Trobe Valley. These deposits which form the bulk of primary energy available to Victoria, compare in extent

with other major deposits of brown coal in the world. Smaller deposits exist in other areas in south-eastern Victoria at Gelliondale, Alberton, and in the south-central region at Anglesea, Bacchus Marsh, and Altona. These deposits, although extensive, do not compare in magnitude and importance with those in the La Trobe Valley and comprise only about 5 per cent of the total economic resource in Victoria.

The Department of Minerals and Energy has been heavily involved during the past ten years in the drilling and assessment of the Stradbroke, Alberton, and Boodyarn coalfields of South Gippsland; additional exploration work has been carried out in the northern part of the Otway Basin. The Department has also investigated the aquifers and groundwater associated with the brown coal seams in the La Trobe Valley. Private companies have explored the coal potential in several areas in Victoria: the Murray Basin (CRA), Maffra (CSR and Shell), Trafalgar (ESSO), Anglesea (WMC), and the Portland-Dartmoor area (WMC).

The Victorian Brown Coal Council has assessed the total brown coal resources at 202,000 megatonnes, or approximately two million petajoules (PJ) of energy, of which 31,000 megatonnes (or some 310,000 PJ) is regarded as readily accessible reserves. Victorian brown coal reserves account for about one-quarter of Australia's readily available fossil fuels in terms of energy content, and to date, less than 2 per cent of them have been used.

Thick coal seams occur close to the surface in two large areas known as the Yallourn-Morwell and the Loy Yang coalfields and in several smaller areas. The Yallourn-Morwell coalfield is split into the Yallourn-Maryvale and the Morwell-Narracan fields by the town of Morwell and the services corridor containing the Princes Highway and the East Gippsland rail line. The brown coal in these seams ranges in geological age from Eocene to early Miocene and is therefore between fifteen and fifty million years old.

Brown coal production by the State Electricity Commission of Victoria from the La Trobe Valley fields decreased from 36.5 megatonnes in 1982 to 32.9 megatonnes in 1983; production from Australian Paper Manufacturers Minerals at Bacchus Marsh also decreased. Production from the Alcoa mine at Anglesea remained constant at about 1.2 megatonnes: this coal is used to produce electrical power for the Company's aluminium smelter at Point Henry, near Geelong.

Other uses for brown coal

Briquettes

Raw brown coal is treated and compressed into regular shaped pellets of a convenient size called briquettes to produce a high grade solid fuel having a moisture content of about 15 per cent. Briquettes are transported more economically than raw coal for industrial and domestic use. They are also used in power stations as a fuel stock for the production of char and can be used to produce liquid hydrocarbons.

Only coal from the Yallourn open cut is used for making briquettes as it is the highest quality coal available in the La Trobe Valley. Approximately three tonnes of raw coal are used to produce a tonne of briquettes and about one tonne of brown coal is used for raising steam used in the process of manufacturing one tonne of briquettes. The annual production of briquettes reached a peak of 1.9 megatonnes during 1965 but declined to less than one megatonne in 1976, after the introduction of natural gas.

Char

Char is a form of high-grade carbon made by the carbonisation of brown coal. It can be used as a source of carbon or as a reducing agent in chemical and metallurgical industries. There are two privately owned plants operating in Victoria at present for the production of char. Both are in the La Trobe Valley and both purchase briquettes and small amounts of brown coal from the State Electricity Commission. The larger plant, at Morwell, has an output capacity of 60,000 tonnes a year.

Other

The brown coal deposits are large and easily accessible, and the coal has been shown to be amenable to the processes of gasification, pyrolysis, solvent refining, and hydrogenation. The potential for its conversion has been widely recognised and a number of proposals are under consideration. The most significant of these has advanced beyond the proposal stage. Erection of a \$200m pilot plant at Morwell in Victoria for the testing of technology for the production of liquid hydrocarbon is almost complete. The plant is being constructed by Brown Coal Liquefaction (Victoria) Pty Ltd, which is a wholly owned subsidiary of Nippon Brown Coal Liquefaction Limited, a consortium of five Japanese companies. The plant will be capable of processing fifty tonnes of dried coal per day.

Other possibilities for the development of brown coal exist. Brown coal may be used as a direct fuel. For example, processes to produce dry, pulverised brown coal have been announced, and if the problems associated with high moisture content and combustibility can be overcome, its use as a direct fuel could increase.

Further, it is possible to produce a wide variety of chemicals from coal tar or coal itself through gasification and synthesis. These include the primary intermediates for the production of a variety of polymers.

Another new area of possible application for Victorian brown coal is the production of special carbons. These include activated carbons for liquid and vapour phase absorption applications, carbon fibres as possible replacement for asbestos and fibreglass, and carbon electrodes for the aluminum smelting industry.

Further references: Victorian Year Book 1980, pp.288-9; Coal to oil conversion, 1982, p.268; Victorian Brown Coal Council, 1983, pp.266-7; Brown coal production since 1935, 1984, pp.271-2

Electricity

State Electricity Commission of Victoria

The State Electricity Commission of Victoria (SEC) is the largest electricity supply authority and individual coal producer. It is a semi-government authority with the principal responsibility of generating or purchasing electricity for supply throughout Victoria (which has an area of approximately 228,000 square kilometres). It may own, develop, and operate brown coal open cuts and briquetting plant and develop the State's hydro-electric resources. It is required to meet all expenditure involved with operating its power and fuel undertakings and to provide for statutory transfers to the Consolidated Revenue of the State. In 1983-84, its revenue was \$1,401m. At 30 June 1984, it had total non-current assets of \$6,807m and a staff of some 22,800.

The SEC was established by an Act of the Victorian Parliament in 1921 and now operates under the *State Electricity Commission Act* 1958. Since it began operating, the SEC has expanded and co-ordinated the generation, purchase, and supply of electricity on a State wide basis to the stage where its system provides almost all the electricity produced in Victoria and its transmission covers almost the entire population of the State. At 30 June 1984, it distributed electricity directly to 1.4 million customers and indirectly to a further 278,500 through eleven metropolitan councils which buy power in bulk for retail distribution under franchises granted by the Victorian Government before the SEC's establishment.

Existing electricity system

Of the State's recoverable fossil fuel reserves, brown coal represents 94.6 per cent, natural gas 2.6, and oil 2.8. The SEC has committed itself to increasing the proportion of total Victorian requirements met with coal based energy.

Victoria's electricity system is based upon the State's extensive brown coal resource in the La Trobe Valley, 140 to 180 kilometres east of Melbourne in central Gippsland, which is one of the largest single brown coal deposits in the world.

The coal is young and soft with a moisture content of 60 to 70 per cent and occurs in thick seams from relatively close to the surface to a depth of several hundred metres. The coal can be won continuously in large quantities and at low cost by specialised mechanical plant. The SEC's coal fired powered stations have been established near the coal deposits because the coal's moisture content would make the coal expensive to transport, every three tonnes of material including two tonnes of water.

The major brown coal fired generating plants in the system are the 1,600 MW Hazelwood and 1,450 MW Yallourn 'W' power stations. Other brown coal fired plants are Morwell (170 MW) and Yallourn 'C', 'D', and 'E' (521 MW). These stations are all located in the La Trobe Valley and generate three-quarters of the State's electricity requirement.

Other thermal stations are Jeeralang (465 MW) gas turbine station in the La Trobe Valley, and the Newport 'D' (500 MW) gas fired station in Melbourne. The Spencer Street (60 MW) oil fired power station ceased operation in 1983. There are hydro-electric power stations in north-eastern Victoria: Kiewa (184 MW), Dartmouth (150 MW), and Eildon/Rubicon/Cairn Curran (135 MW). Victoria is also entitled to about 30 per cent of the output of the Snowy Mountains hydro-electric scheme and half of the output of the Hume hydro-electric station near Albury.

The SEC's total installed generating plant capacity at 30 June 1984 was 6,784 MW, including both capacity within the State and that available to it from New South Wales. In 1983-84 electricity

generated by the SEC in its thermal and hydro-electric power stations and purchased totalled 25,752 million kWh.

Power station construction

Construction of the Loy Yang 'A' power station complex south-east of Traralgon in the La Trobe Valley was authorised by the Victorian Government in 1976. Coal-fired, Loy Yang will provide base load electricity for the Victorian grid and almost double the State's generating capacity. The project nominally comprises two 2,000 MW power stations, Loy Yang 'A' and Loy Yang 'B' in eight 500 MW units. The first unit came into service in 1984.

POWER STATIONS' LOCATION, RATING, AND PRODUCTION, VICTORIA

	Maria			Electricity production				
01	mum	198	1-82	1982	2-83	1983-84		
Station	contin- uous rating (a)	Quantity	Percent- age of produc- tion	Quantity	Percent- age of produc- tion	Quantity	Percent- age of produc- tion	
	MW	Mill kWh		Mill kWh		Mill kWh		
Thermal stations -								
Hazelwood	1,600	8,174	33.4	6,697	26.6	6,829	26.5	
Yallourn	521	2,310	9.5	2,059	8.2	2,042	7.9	
Yallourn 'W'	1,450	7,608	31.1	8,882	35.3	8,248	32.0	
Morwell	170	1,010	4.1	1,092	4.3	1,059	4.1	
Newport 'C' (b)		60	0.2					
Newport 'D'	500	2,752	11.2	2,626	10.4	3,210	12.6	
Spencer Street (c)	60	82	0.3	6	- ::	2		
Jeeralang	465	2,277	9.3	1,310	5.2	1,377	5.3	
Loy Yang 'A'						376	1.5	
Total SEC thermal	4,766	24,273	99.1	22,672	90.0	23,143	89.9	
Hydro stations -								
Kiewa (d)	184	415	1.7	187	0.7	337	1.3	
Eildon (e)	135	312	1.3	258	1.0	189	0.7	
Dartmouth	150	10		485	1.9	6		
Total SEC								
hydro	469	737	3.0	930	3.7	532	2.0	
Total SEC	5,235	25,010	102.2	23,602	93.7	23,675	91.9	
Net purchases		Cr.527	Cr.2.2	1,594	6.3	2,077	8.1	
Total	5,235	24,483	100.0	25,196	100.0	25,752	100.0	

(a) At 30 June 1982.
(b) Newport 'C' power station retired from service in December 1981.
(c) Melbourne City Council station.
(d) McKay Creek, West Kiewa, and Clover.
(e) Eildon, Rubicon, Lower Rubicon, Royston, Rubicon Falls, and Cairn Curran.

Source: State Electricity Commission of Victoria.

Transmission and distribution

Except for some isolated and remote areas of the State, the distribution of electricity throughout Victoria has been completed. Main transmission is by 500, 330, 220, and 66 kV transmission lines which supply the principal distribution centres and interconnection between generating sources.

Three 500 kV transmission lines and six 220 kV lines link the La Trobe Valley stations with Melbourne and the State grid while three 300 kV lines provide the interstate link, two through the Snowy scheme. Bulk distribution of power throughout the main regional areas is by 200 kV lines to terminal stations which reduce the voltage to 66 kV or 22 kV for delivery to zone substations for further distribution. Feeder lines then deliver to distribution substations which in turn reduce the voltage to 415/240 volts for reticulation to individual customers. Some big industrial concerns take power at higher voltages.

Major development of Victoria's transmission system in 1983-84 included completion of the first and second 500 kV lines from Loy Yang power station to Hazelwood terminal station. Construction is in progress on a 220 kV line between Moorabool, near Geelong, and Ballarat. Construction is also in progress on a 500 kV line between Sydenham and South Morang to reinforce supply to the western area of the State.

Further references: Victorian Year Book 1982, p. 271; Jeeralang, 1981, p. 290; Portland transmission line, 1982, pp.271-2; Electricity production since 1934, 1984, pp.253-60

Petroleum

Petroleum products were first imported into Victoria from the United States of America, in drums, during the last few years of the nineteenth century. Australia's first refinery was a small one built by Commonwealth Oil Refineries Ltd., at Laverton, Victoria in 1924. In order to cope with a rapidly increasing demand for petroleum products after the Second World War two major refineries were erected. The first of these was Shell Australia's refinery at Corio, near Geelong, which was commissioned in 1954; the second was the Standard Vacuum Refinery, now Petroleum Refineries (Australia) Pty Ltd, which commenced full scale operations at Altona in 1955. This latter event led to the closure of the small Laverton refinery. A third major refinery was built by BP Refinery (Westernport) Pty Ltd at Crib Point in 1965; this installation ceased to operate in April 1985. These three refineries have supplied the Victorian marketing area with almost all of its refined products.

Exploration

Exploration for petroleum has been carried out in Gippsland since the 1920s, and almost continuously in the offshore waters of the Gippsland Basin in eastern Bass Strait since 1960, principally by the partnership of Hematite Petroleum Pty Ltd (a wholly owned subsidiary of the Broken Hill Proprietary Co. Ltd) and Esso Exploration and Production Australia Inc., with Esso Australia Ltd as the operator. Four other companies (B.O.C. of Australia Ltd., Endeavour Oil N.L., NSW Oil and Gas Co. N.L., and Shell Development [Aust] Pty Ltd) drilled seven wells during the 1970s, but without success.

During recent years there has been some investigations of sediments beneath those in which hydrocarbons have been previously located: Wirrah-3 drilled by Esso in 1984, and Basker-1 drilled by Shell in 1983 have both encountered oil. Basker-1 has provided the best flow of oil under test from any well not owned by Esso-BHP. These discoveries, although small, are important at a time when oil supplies from the known reservoirs are beginning to be depleted. They confirm the potential existence of oil and gas reservoirs in deeper sediments.

A major investigation into the oil and gas potential of the Otway Basin was commenced in 1984 as a joint project. Participants in this project are the Department of Minerals and Energy, Victoria; Department of Mines and Energy, South Australia; Mines Department, Tasmania; and the Commonwealth Bureau of Mineral Resources. The project is based on studies carried out by the Department of Minerals and Energy, Victoria.

At 30 June 1984, there were ten Petroleum Exploration Permits onshore in Victoria. Offshore there were eight Exploration Permits for Petroleum and eleven Production Licences for Petroleum. All of the Production Licences are held by Esso-BHP.

Development of Bass Strait fields

The initial stage of development took place between 1967 and 1971, when the four commercial fields discovered at that time were developed as an integrated system. These were the Barracouta and Marlin gasfields and the Halibut and Kingfish oilfields, together with a small oil reservoir in the Barracouta field. This resulted in the construction of the five first-generation platforms listed below: (1) Barracouta platform, over the Barracouta gas and oilfield, with eight gas wells and two oil wells. Production started in March 1969.

(2) Marlin platform, over the Marlin gasfield, with seventeen gas wells and four oil wells. Gas production started in January 1970. The four oil wells allocated for this platform were brought into production during 1982 after the installation of production facilities to produce oil from a small accumulation beneath the main gas reservoir.

(3) Halibut platform, over the Halibut oilfield, with twenty-one oil wells. Oil production started in March 1970.

(4) Kingfish 'A' platform, over the Kingfish oilfield, with twenty-one oil wells. Oil production started in April 1971.

Well	Operator	Spud date (a)	Date total depth reached	Rig released	Total depth	Status
					metres	
Omeo-1	Aquitaine	2 11 82	23 2 83	10.2.83	3 380	Oil and gas show
Pilotfish-1A	Esso-BHP	17 12 82	10.1.83	21.1.83	3.521	Dry
Volador-1	Shell	26.12.82	23.3.83	19.4.83	4,611	Oil and gas show
Selene-1	Phillips	27.12.82	5.2.83	13.2.83	3,539	Dry
Wirrah-2	Esso-BHP	22.1.82	23.2.83	5.3.83	3,084	Oil and gas show
Kyarra-1	Aquitaine	11.2.83	1.2.83	15.2.83	210	Aborted
Hermes-1	Phillips	15.2.83	21.4.83	19.5.83	4,565	Oil and gas show
Kyarra-1A	Aquitaine	16.2.83	23.2.83	1.3.83	1,280	Dry
Tarra-1	Aquitaine	4.3.83	2.4.83	21.4.83	2,905	Dry
Whiting-1	Esso-BHP	6.3.83	5.4.83	28.4.83	3,011	Oil discovery
Curdievale-1*	Beach	17.3.83	24.3.83	27.3.83	1,176	Dry
Green Banks-1*	Beach	4.4.83	12.4.83	14.4.83	1,226	Dry
Basker-1	Shell	21.4.83	12.6.83	10.9.83	3,991	Oil discovery
Teraglin-1	Esso-BHP	30.4.83	26.5.83	2.6.83	3,371	Dry
Athene-1	Phillips	22.5.83	7.7.83	4.9.83	3,385	Dry
Luderick-1	Esso-BHP	4.6.83	24.6.83	1.7.83	3,021	Oil and gas show
Mildura West-1*	Sth Aust. O and G	14.6.83	17.6.83	18.6.83	428	Dry
Mildura West-2*	Sth Aust. O and G	20.6.83	24.6.83	25.6.83	597	Dry
Robinvale-1*	Sth Aust. O and G	28.6.83	30.6.83	1.7.83	246	Dry
Snapper-4	Esso-BHP	2.7.83	12.9.83	22.9.83	2,821	Oil well with gas
						show
Bridgewater Bay-1	Phillips	15.9.83	2.12.83	9.12.83	4,200	Dry
Bignose-1	Shell	16.9.83	30.10.83	21.11.83	3,995	Gas show
Sunfish-2	Esso-BHP	23.9.83	8.10.83	14.10.83	2,647	Oil discovery
Wrasse-1	Esso-BHP	28.10.83	21.11.83	25.11.83	2,984	Dry
Basker South-1	Shell	23.11.83	24.12.83	6.1.84	3,420	Dry
Wirrah-3	Esso-BHP	27.11.83	17.1.84	27.2.84	3,257	Oil and gas well
Lindon-1*	Beach	1.12.83	1.1.84	5.1.84	3,011	Oil show
Manta-1	Shell	8.1.84	15.2.84	23.3.84	3,572	Oil and gas
a. a 1.44						discovery
Stonyford-1*	Gas and Fuel Exp.	14.1.84	26.1.84	29.1.84	1,203	Dry
Veilfin-1	Esso-BHP	2.3.84	30.3.84	15.4.84	3,521	Gas discovery
Chimaera-1	Shell	28.3.84	13.5.84	19.5.84	3,826	Gas show
Wyrallah-1	Aquitaine	16.4.84	21.4.84	27.4.84	1,160	Dry
west Fortescue-1	Esso-BHP	4.5.84	10.5.84	25.5.84	2,671	Oil and gas show
Tuna-4	Esso-BHP	18.5.84	7.7.84	31.8.84	3,321	Oil well
Speke-1	Aquitaine	14.6.84	5.7.84	10.7.84	2,772	Dry

EXPLORATION WELLS, VICTORIA, 1 JANUARY 1983 TO 30 JUNE 1984

(a) The date drilling commenced.

*Onshore.

(5) Kingfish 'B' platform, over the Kingfish oilfield, with twenty-one oil wells. Oil production started in November 1971.

The second stage of development took place from 1973 onwards with construction of the following second-generation platforms and the completion of one sub-sea well:

(1) Mackerel platform, over the Mackerel oilfield, with eighteen oil wells. Two of the eighteen wells are high-angle wells drilled directionally to drain the south end of the Mackerel field about four kilometres from the platform. Oil production started in December 1977. Drilling was completed in November 1980.

(2) Sub-sea Cobia 2 oil well, over the Cobia oilfield, came on stream in June 1979. This was the first sub-sea well completed in the Gippsland Basin fields and the crude oil from this well is conveyed by two 100 mm submarine pipelines to the Mackerel platform. This was also the first project having the pre-welded pipelines laid by the spooling method from a specially adapted ship.

(3) Tuna platform, over the Tuna gas and oilfield, with eighteen wells. Oil production started in May 1979; gas production commenced in September 1979. Drilling of all wells on this platform was completed during 1981.

(4) Snapper platform, over the Snapper gas and oilfield. The platform was erected in May 1979 and development drilling of the planned twenty-seven wells commenced in March 1981. Production started in July 1981.

Four third generation platforms have now been constructed, bringing the total number of platforms in Bass Strait to twelve:

(1) West Kingfish platform over the west end of the Kingfish oilfield. The platform was launched and set in position in August 1981. Development drilling was completed in May 1984.

(2) Cobia platform over the Cobia oilfield. Construction was completed in early 1983 and development drilling commenced on 1 March 1983. Wells are drilled into both the Cobia and Fortescue reservoirs. Production commenced in April 1983.

(3) Fortescue platform over the Fortescue oilfield. The jacket was set at the end of 1982 and drilling commenced on 12 June 1983. Production commenced in September 1983.

(4) Flounder platform over the Flounder gas and oilfield. The jacket was set in July 1983 and development drilling commenced in August 1984.

During 1983 and 1984 much activity was associated with the advancing age of the platforms and petroleum fields. This entailed the strengthening of the foundations of three of the first generation platforms arising from studies by Esso-BHP at the instigation of the Department of Minerals and Energy. Gas lift and water handling facilities have been progressively introduced on various platforms to boost declining oil-flow rates and remove increasing amounts of water which enters together with the oil as reservoirs are depleted.

Production

During 1983-84, petroleum production reached its highest level since 1979 and consisted primarily of 19.2 million tonnes (24.0 gigalitres) of stabilised crude and 1.7 million tonnes (3.2 gigalitres) of LPG products. This was made possible by Commonwealth Government policy changes which forced local refiners to absorb given quantities of Bass Strait crude oil and allowed the export of crude oil produced in excess of local requirements. Other influencing factors were improvements at the gas processing and crude oil stabilisation plant at Longford, and a new drag-reducing additive in the main delivery pipelines which has permitted greater through-put with no additional pumping capacity.

ROYALTIES FROM OIL AND GAS PRODUCTION, VICTORIA (\$'000)

Year	Amount received	Amount paid to Commonwealth	Amount retained by Victoria
1978-79	87,146	28,031	59,115
1979-80	132,639	43,337	89,302
1980-81	171,839	54,567	117,272
1981-82	159,760	52,321	107,439
1982-83	188,280	62,665	125,615
1983-84	257,937	84,245	173,692

Source: Department of Minerals and Energy.

CRUDE OIL PRODUCTION (a), VICTORIA

Year	Barrel	s	Kilolitres		
	During year	Average barrels/day for year	During year	Average kilolitres/ day for year	
1978 1979 1980 1981 1982 1983	146,826,012 149,790,661 128,993,885 134,281,582 127,069,873 137,337,035	402,263 410,385 352,442 367,895 348,137 376,266	23,343,427 23,790,661 20,508,424 21,349,102 20,202,530 21,834,881	63,955 65,180 56,034 58,491 55,349 59,822	

(a) After processing.

Source: Esso Australia Ltd.

Reserves

The Bass Strait oil and natural gasfields will supply Victoria and other markets with natural gas until well into the twenty-first century at the anticipated rate of consumption. It is estimated that an energy equivalent of 8.5 million terajoules will be available if new gasfields are not discovered. The crude oil reserves, equivalent to 17.3 million terajoules, will be seriously depleted by the late 1980s unless new discoveries are made in Victoria and Australia during the next few years.

The crude oil from the Bass Strait oilfields is deficient in the heavier lubricating fractions and the main commercial derivatives are light petroleum liquids ranging from heating oil to motor spirit. Victoria and Australia still depend on overseas crude oil for production of medium to heavy lubricating oils.

The declared recoverable reserves from the licence areas are lower than in 1982 (except for natural gas) because additional reserves have not been detected.

ESTIMATED HYDROCARBON RESERVES, VICTORIA (gigalitres)

(8-8-11-1-5)						
ltem	1982	1983	1984			
Crude oil Natural gas Condensate LPG	217 178 28 59	199 176 23 49	179 159 20 46			

1 gigalitre = 10^9 litres.

Further references: Victorian Year Book 1982, pp.273-4; Liquid Fuels, 1984, pp.264-70

Refining

The three refineries in Victoria are: Shell Refining (Australia) Pty Ltd at Corio near Geelong, Petroleum Refineries (Australia) Pty Ltd at Altona, and BP Refinery (Western Port) Pty Ltd at Crib Point, Western Port. Shell Refining (Australia) Pty Ltd also operates a plant at its Corio refinery for the production of lubricating oil. Refining capacity at 1 December 1984 is set out in the following table:

Refinery	Location in Victoria and year refinery came on stream	Primary processing capacity (a)
Shell Refining (Australia) Pty Ltd	Corio near Geelong 1954	110,000 to 132,000 BSD 5,000,000 tonnes/year
(Lubricating oil plant)	Corio near Geelong 1954	3,000 BSD 145,000 tonnes/year
Petroleum Refineries (Australia) Pty Ltd	Altona near Melbourne 1949	100,000 BSD 4,670,000 tonnes/year
BP Refinery (Western Port) Pty Ltd	Crib Point on Western Port Bay 1966	60,000 BSD 2,540,000 tonnes/year

REFINING CAPACITY, VICTORIA, AT 1 DECEMBER 1984

(a) BSD: barrels per stream day.

Source: Oil and Australia, Australian Institute of Petroleum Ltd.

Each refinery also imports crude oil from the Middle East for the production of special products including bitumen, asphalt, and certain other heavy products. A certain amount of light ends such as motor spirit and aviation jet fuel are also produced in the process of treating these imported crude oils.

Transportation

Indigenous processed crude oil is shipped by tanker from the Long Island Point and Crib Point jetties at Western Port to refineries in Sydney and Brisbane and by pipeline to Victoria's three local refineries.

The three refineries in Victoria import between 4.5 and 5 million barrels (0.7 to 0.8 million kilolitres) of crude oil each year from the Persian Gulf, and also import approximately 1.3 million barrels (0.2 million kilolitres) of wholly or partially refined products from overseas or from other States in Australia. Approximately 35 million barrels (5.6 million kilolitres) of wholly or partially refined products are exported to overseas destinations such as New Zealand or the Pacific Islands or transported to other States within Australia.

Marketing

Motor spirit in two grades – 97 octane (super grade) and 89 octane (standard grade) – and a wide range of other petroleum products are marketed in Victoria through a number of industry terminals and depots and 2,541 retail outlets (30 June 1983), the majority of which are operated by the nine

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major oil companies. At 30 June 1983, Victoria had the capacity to store 3,246,200 kilolitres of crude oil and petroleum products in bulk at 21 installations: in Melbourne (14), Geelong (1), Crib Point (1), Long Island Point(1), and Portland(4), including refineries.

Item	1982	1983	1984
		Megalitres	
Aviation gasoline	16.02	15.37	14.59
Motor spirit			
Super	4,017.28	3,995.06	4,134.21
Standard	262.75	227.18	205.11
Total	4,280.03	4,222.24	4,339.31
Power kerosene	4.73	3.96	4.20
Aviation turbine fuel	480.45	416.52	432.11
Lighting kerosene	31.80	28.01	25.45
Heating oil	98.33	87.46	75.75
Automotive distillate –			
Inland	1,251.71	1,276.79	1,342.43
Bunkers	43.78	5.75	6.94
Total	1,295.49	1,282.54	1,349.37
Industrial diesel fuel –			
Inland	40.59	38.67	92.64
Bunkers	81.17	54.36	55.77
Total	121.76	93.03	148.42
Fuel oil –			
Inland (a)	182.20	90.94	86.26
Bunkers	351.98	310.20	344.01
Total	534.18	401.14	430.27
Grand total (b)	6,862.79	6,550.27	6,819.46

PRINCIPAL PETROLEUM PRODUCTS MARKETED, VICTORIA, 1982 TO 1984

(a) Excluding refinery fuel.

(b) Other petroleum fuels, including refinery oil, are no longer included as principal petroleum products marketed. Source: Oil and Gas Division, Department of National Development and Energy, Canberra.

Liquefied petroleum gas (propane and butane)

Liquefied petroleum gas (LPG) is produced at the Esso-BHP fractionation plant at Long Island Point and by Victoria's three refineries. The principal distributor in Victoria is the Gas and Fuel Corporation of Victoria. A number of oil companies and other marketing companies also distribute LPG throughout the State in accordance with the provisions of the *Gas Franchises Act* 1970.

The Long Island Point facilities produce over 75 per cent of the total production of LPG in Victoria. The establishment of the Long Island Point facilities is described in the 1977 edition of the Victorian Year Book.

Annual production of propane and butane at the Long Island Point plant is now approximately two million tonnes. The total storage capacity at the plant comprises six tanks, each of 10,000 tonnes capacity of either butane or propane and a 20,000 tonne capacity tank to store butane. Nearly all the production at Long Island Point is shipped to Japan.

Ethane gas

Ethane gas is produced at the Long Island Point Fractionation Plant and has since 1972 been conveyed through a pipeline to the Altona Petrochemical Company Limited at Altona. Hydrocarbon Products Proprietary Limited at West Footscray have a plant using ethane gas as a feedstock, which is conveyed by pipeline from Altona.

Further references: Discovery and development of crude oil in Victoria, Victorian Year Book 1974, pp.382-5; Developments in energy since 1970, 1984, p.270

Gas industry

Introduction

The gas industry in Victoria dates from the formation of the City of Melbourne Gas and Coke Company in 1850 with the objective of lighting the City of Melbourne by gas. Many other gas companies were formed in the more heavily populated suburbs of Melbourne and country towns of the State during the second half of the nineteenth century, many by municipal authorities.

Gas and Fuel Corporation of Victoria

In 1877, the Metropolitan Gas Company was formed by the amalgamation of three companies, one of which was the City of Melbourne Gas and Coke Company. The former company subsequently joined with the Brighton Gas Company and the State to form the Gas and Fuel Corporation of Victoria. Since then, the structure of the industry has changed from multiple privately owned utilities to gradual unification under the Gas and Fuel Corporation of Victoria – a public authority of the State owned jointly by the Victorian Government and private shareholders.

With the purchase of the Gas Supply Company's Victorian undertakings in 1970, The Geelong Gas Company in 1971, and Colonial Gas Holdings Limited in 1973, complete unification of the gas industry was achieved. The acquisition of The Albury Gas Company Ltd in 1974 made it possible for the Corporation to extend natural gas supply to the Albury/Wodonga Development Project. The Gas and Fuel Corporation of Victoria is now the sole distributor of gas in Victoria.

During the 1970s, the Corporation progressively extended its natural gas supply system to the point where 99.7 per cent of the reticulated gas supplied in Victoria is natural gas, and this fuel is currently accessible to more than 80 per cent of the State's population. In 1983-84, natural gas provided 57 per cent of Victoria's total secondary energy requirements, excluding transport.

In areas where it is not economic to supply natural gas, the Corporation meets the community demand for gaseous fuel either by providing a reticulated gas supply based on liquefied petroleum gas (LPG) or by supplying LPG in cylinders or bulk.

Future sources

Approximately 5.3 billion gigajoules (50 billion therms) of the gas reserves in Esso-BHP's Bass Strait fields were contractually dedicated to the Corporation from 1 January 1975, with an option on a similar quantity from any further reserves established in Victoria by the partners.

In keeping with its responsibility to meet the needs of its consumers and ensure continuing security of gas supply, the Corporation, through a fully owned subsidiary company, Gas and Fuel Exploration N.L., is engaged in exploring for oil and gas in the Bass Strait area in joint ventures with Beach Petroleum N.L. and Hudbay Oil (Australia) Ltd in the offshore Gippsland Basin; with Phillips Australian Oil Company and Mount Isa Mines Ltd in the offshore Otway Basin; and in its own right in the onshore Otway Basin.

Supplies of natural gas contractually dedicated to the Corporation are adequate to meet the estimated overall requirements of the Victorian market until the years 2000/2005 and it is anticipated that current and future exploration programmes in the Gippsland and Otway Basins will result in the definition of further resources.

However, if major additional reserves are not developed in these areas and supplies of natural gas are not available from other sources, the Corporation plans to establish large scale substitute natural gas (SNG) production facilities to meet the community's demand for gaseous fuel. This long-term requirement of coal for SNG production is being taken into account in planning the development of the State's brown coal resources.

Conservation of energy

In 1977, the Corporation established Australia's first Energy Management Centre to advise industry and commerce on the efficient use of energy. This Centre provides educational, consulting, and development services to companies and government and international agencies, in a number of spheres including energy auditing and equipment evaluation and demonstration.

In 1978, the Corporation established an Energy Information Centre at 139 Flinders Street, Melbourne, to provide information to the general public on all aspects of the use of energy. It is also actively involved in research directed towards the development of efficient gas appliances, and in promoting low energy housing, the use of insulation in domestic dwellings, and the conversion of motor vehicles to LP Gas operation. These activities have played a significant part in increasing public awareness of the need to conserve energy and in improving the efficiency of energy utilisation in industry, commerce, and homes throughout Victoria.

Gas supply areas

At 30 June 1984 (1983), the Corporation was supplying 975,643 (941,623) consumers with gas through a network of approximately 19,850 (19,572) kilometres of mains. Of these consumers, 952,753 were receiving natural gas, 14,982 were provided with a reticulated supply based on liquefied petroleum gas, and 7,908 Albury (New South Wales) consumers received natural gas.

The areas provided with a reticulated gas supply at 30 June 1984 are shown in the following table:

Sumling	Area supplied with -					
Supplier —		Natural gas		Tempered LPG		
Gas and Fuel Corporation	Bacchus Marsh Ballan Ballarat Benalla Bendigo Broadford Castlemaine Churchill Daylesford Drouin Euroa Geelong Girgarre Greater Melbourne	Kyabram Kyneton Lara Longwarry Maffra Maryborough Merrigum Moe Mooroopna Mornington Peninsula Morwell Ocean Grove Pakenham Point Lonsdale	Queenscliff Rochester Rosedale Sale Seymour Shepparton Stanhope Tatura Trafalgar Trafalgar Trafalgon Wallace Wangaratta Warragul Wodonga	Ararat Colac Hamilton Horsham Portland Stawell Warrnambool		

AREAS SUPPLIED WITH GAS, VICTORIA, AT 30 JUNE 1984 (a)

(a) In addition, the Gas and Fuel Corporation provides a reticulated gas supply in Albury, New South Wales, through its wholly owned subsidiary, the Albury Gas Company Limited. Throughout Victoria and the Riverina, the Gas and Fuel Corporation provides bottled and bulk liquefied petroleum gas to 126,300 consumers.

Source: Gas and Fuel Corporation of Victoria.

Sales

The degree to which natural gas has penetrated the competitive energy market in Victoria is reflected by the fact that total sales by gas utilities (including Tempered LPG) have risen from 12,800 terajoules in 1967-68 – the last full year of manufactured gas supply – to a total of 136,626 terajoules in 1981-82. Coupled with a downturn in industry and the introduction of energy efficiency programmes, in 1983-84 the consumption of gas dropped to 134,705 terajoules. The following table indicates the impact of natural gas in all three markets, with by far the greatest increase in total gas consumption occurring in the industrial market:

COMMERCIAL SALES OF NATURAL GAS (a), VICTORIA

Year	Quantity	Quantity
	million m ³	million ft ³
1978	3,461.135	122,178.065
1979	4,020.826	141,993.360
1980	4,547.774	160,603.270
1981	5,701.777	201,356.540
1982	5,686.453	200,815.380
1983	5,646.299	199,397.350

(a) Includes sales, field, and plant usage.

Source: Department of Resources and Energy, Canberra.

SALES OF GAS (a), VICTORIA	
(teraioules)	

Year	Domestic	Commercial	Industrial	Total
1978-79	35,056	8,675	65,407	109,138
1979-80	36,979	9,425	70,286	116,690
1980-81	40,495	10,276	75,627	126,398
1981-82	46,037	11,603	78,986	136,626
1982-83	47,285	12,289	73,739	133,313
1983-84	49,705	12,911	72,089	134,705
	,	,	,	,

(a) Includes sales to Albury/Wodonga

Source: Gas and Fuel Corporation of Victoria.

Further reference: Gas and Fuel, Victorian Year Book 1984, pp.260-4

MINERALS

Economic natural resources

Introduction

Mineral discoveries in Victoria in the past have had an important effect both on the State and Australia as a whole. The first major mineral development occurred in the 1850s with the gold discoveries and the subsequent gold rushes in various parts of the State. A less spectacular development, but one equally important for Victoria's economy, was the commencement of the utilisation of the La Trobe Valley brown coal deposits for power generation in the 1920s. Other major developments were the oil and gas discoveries in eastern Bass Strait during the 1960s.

The recent world energy crisis has emphasised that liquid fuel deposits are not infinite and that in the future, liquid hydrocarbons may have to be manufactured from coal. Victoria, with its vast reserves of brown coal, may be in an excellent position to continue to supply a substantial part of Australia's liquid fuel requirements in the future.

Following the discovery of a copper-zinc deposit by Western Mining Corporation in an area east of Benambra in 1978, further drilling in the area has established the existence of two separate bodies containing copper and zinc, in the Wilga and Currawong prospects. Silver is an important constituent of these ore bodies. The two bodies constitute the most important finds of base metals in Victoria and have stimulated exploration in the State.

Legislation

The main purpose of the *Mines (Amendment) Act* 1983 was the resolution of the competing requirements of claim owners and the holders of exploration licences. With the passing of the Act, the mining industry in Victoria is now able to more clearly identify its rights and obligations. In addition, the Act clarified a wide range of matters in which the *Mines Act* 1958 was either unclear or silent. Among the more important amendments affecting exploration are a five-year limit on the term of exploration licences, compulsory relinquishment requirements at two and four-year stages, and a greater freedom for registration of claims within exploration licence areas. These changes should have the effect of encouraging companies to pursue their exploration programmes more vigorously.

The Act has created the office of Mining Warden, whose job is to resolve disputes relating to mining and prospecting.

Geological Survey of Victoria

The Geological Survey of Victoria, formally established in 1856 was in 1867 brought under the control of the Minister of Mines and since 1 September 1977 has functioned as a division in the Department of Minerals and Energy.

The early work of the Survey included detailed surface and sub-surface geological mapping of the important goldfield areas. In the 1890s, studies were extended to the black coal deposits in south Gippsland, culminating in the discovery of the Wonthaggi coalfield in the early 1900s.

In the period from 1910 to 1920, the Survey intensified the mapping programmes and undertook surveys of the brown coal deposits of the La Trobe Valley. The Department initiated the re-opening of the Morwell open cut at Yallourn North and developed the brown coalfields as a source of fuel before this responsibility was transferred to the State Electricity Commission of Victoria in 1920.

After the Second World War, the activities of the Survey were diversified with the growing interest in petroleum exploration, groundwater investigation, engineering geology, and the extractive industries. The studies carried out on the Tertiary stratigraphy and micropalaeontology of the onshore Gippsland Basin set a basis for the discovery of the oil and gasfields of Bass Strait during the middle 1960s.

In summary, the main activities of the Survey are: the investigation of Victoria's geological structure, and mineral and groundwater resources; and the provision of basic information on these matters in the form of geological maps, reports, and advice to industry, the public, and Commonwealth and Victorian Government departments. The Survey also serves as geological consultant to government agencies when required, and provides scientific information for the appraisal, development, and conservation of Victoria's sub-surface resources.

Exploration

Significant developments during 1982-83 were: the discovery of the Wonga open cut gold prospect, near Stawell, by Western Mining Corporation; investigations into possible mining for gold in deep leads by solution mining techniques at Eastville, near Maldon; the discovery of mineralisation at





'Warrock' an historic homestead near Casterton in the Western District is an example of an early pastoral station. The property, built in the 1840s, contains about 30 buildings and has been preserved by one family for five generations. *Telecom Australia*

The decorative gates at the main entrance to the Royal Botanic Gardens, Melbourne. The gates were originally at 'Nareeb', a residence in Toorak, and were relocated to their present site in the 1960s.

National Trust of Australia (Victoria)



The original Royal Exhibition Building, located in the Carlton Gardens, Melbourne, was completed for the first International Exhibition in 1880. The present building incorporates various annexes which are used for numerous exhibitions and activities.

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The Melbourne Central Business District, viewed from the historic Williamstown foreshore on Hobsons Bay.

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MINERALS

several localities in East Gippsland including Buchan and Boulder Flat; and the continued exploration by Western Mining Corporation at the Currawong copper-zinc prospect, east of Benambra.

Gold

During 1983-84 gold prices fell from \$US14.50 per gram (\$US450 per oz) to \$US12.00 per gram (\$US373 per oz) and demand for gold eased. Gold mining activity has been somewhat depressed. A number of small mines are producing or being developed, particularly in the north-east and east of Victoria. The Wattle Gully Gold Mine at Chewton has now ceased operations.

Other minerals

Production of agricultural gypsum was low during the early part of 1983 owing to the drought. However, it increased considerably following the good harvest at the end of the year. Australian Gypsum Pty Ltd continued to produce gypsum for the plaster industry mainly from their Tutye lease. Small amounts of other minerals produced in Victoria included iron ore, clay, kaolin, and bauxite.

Construction materials

Quarrying activities varied throughout Victoria, but generally the demand for hard rock and gravel has increased. In some parts of the State there has been more use made of mobile crushing plants; their use will probably increase in future as contracts are let for the supply of fixed amounts of material for a specific purpose, e.g. for a new road or bridge. The demand for dimension stone, used in building construction, increased, and producers had some difficulty in meeting the demand. Quarry products used for construction (including clay), and limestone for the manufacture of lime and cement totalled 33 megatonnes in 1982-83 (production in 1981-82 was 28.5 megatonnes).

Mining and quarry production

The mining and quarrying production of Victoria from lands occupied under the Mines Act and the Extractive Industries Act is recorded by the Victorian Department of Minerals and Energy, and from other lands by the Australian Bureau of Statistics. The production from both sources for the years 1980-81 to 1982-83 is shown in the following table:

Minand	11-:4	1980-	81	1981-	-82	1982	-83
Mineral	Onic	Quantity	Value	Quantity	Value	Quantity	Value
			\$'000		\$'000	_	\$'000
Metallic minerals –							
Antimony ore	tonnes	-	-	-	-	-	-
Bauxite	.,	3,123	28	8,493	54	n.p.	n.p.
Gold bullion	'000 gms	65	863	87	853	115	1,370
Iron ore	tonnes	170	2	-	-	-	-
Tin concentrate	,,		-	_	-	-	-
Total value of metallic minerals			893		907		n.p.
Coal -							
Brown coal (a)	'000 tonnes	29,212	107,052	34,904	137,138	33,042	150,788
Briquettes	"	1,081	22,230	993	22,754	760	19,808
Total value of coal (a)			129,282		159.892		170,596
Petroleum products (b) –		-					
Crude oil	'000 kilolitres	20.508		ר 20,994 ב		20,188	ſ
Ethane (c)	**	125,894		151,878		169,198	
Liquefied petroleum gas -		1	d)1,338.820	· · · ·	(d)1,491,646	i i	λ n.p.
Propane (c)	"	1,456	, , , , , , , , , , , , , , , , , , , ,	1,535		1,514	· · ·
Butane (c)	"	1,434		1,495		1,392	1
Natural gas	million kilolitres	4,077		5,821		5,531	J
Construction materials -							
Crushed and broken stone -							
Basalt	'000 tonnes	9,659	54,348	10,176	64,007	9,353	68,546
Dacite, Rhyodacite, and Toscanite	.,	471	2,961	1,395	12,373	1,314	13,227
Granite	.,	766	5,098	709	5,300	787	6,910
Hornfels	••	543	2,249	931	6,146	980	6,462
Limestone	,,	1,138	1,830	551	1,227	494	1,911
Quartz and quartzite	,,	63	134	51	174	52	284
Sandstone	,,	1,315	2,229	1,611	3,628	2,161	5,789
Shale and schist	,,	118	309	-	-	226	1,346
Slate	.,	-	-	-	-	-	-
Other crushed and broken stone	.,	198	294		-		-
Total crushed and broken stone	••	14,271	69,452	15,424	92,855	15,367	104,475
Sand - For concrete	,,	3,736	14,548	4,439	17,348	4,221	21,626
For other purposes	,,	4,194	9,524	3,371	10,547	2,934	6,859
Gravel	,,	4,751	6,863	5,057	8,695	4,478	9.347

MINING AND QUARRYING PRODUCTION, VICTORIA

		198	0-81	1981-82		1982-83	
Mineral	Unit	Quantity	Value	Quantity	Value	Quantity	Value
			\$'000		\$'000		\$'000
Dimension stone – Granite	tonnes	26,556	688	18,187	618	16,622	596
Slate	**	2,445	91	1,593	35	1.631	38
Other	.,	3	-	125	5	6,468	180
Total dimension stone		29,004	779	19,905	658	24,721	814
Other construction materials -							
Earth, soil, and filling	'000 tonnes	1,295	2,215	1,184	2,728	818	2,324
Salamander	••	438	1,095	503	992	- 460	630
Scoria	**	1,143	3,015	1,199	3,685	1,026	3,801
Other (e)	,,	2,518	15,394	249	670	241	523
Total other construction materials	"	5,394	21,719	3,135	8,075	2,545	7,278
Total value of all types of construction materials			122,886		138,178		150,399
Other non-metallic minerals							
Clay - brick and cement	'000 tonnes	1.210	1.720	975	1.659	1.000	2.352
fire	,,	.,8	54	17	134	9	84
kaolin – refined	,,	33	3,827	32	4,413	30	4,234
unrefined	,,	3	22	28	116	17	73
stoneware	,,	76	150	56	94	64	103
pipe and tile	••	21	44	39	168	n.p.	n.p.
bentonitic	••	3	64	-	-	-	-
other clays (f)	,,	42	1,783	67	2,201	34	2,307
Diatomite	tonnes	634	137	1,499	1 94	n .p.	n.p.
Dolomite	'000 tonnes	-	-	-	-	-	-
Gypsum	,,	370	1,325	416	2,076	88	854
Limestone	,,	2,351	9,837	2,114	9,813	2,034	9,642
Salt	,,	74	1,786	78	2,206	57	1,838
Silica	,,	288	3,069	361	4,546	348	4,161
Total (value of non-metallic mineral	s)		23,818		27,620		25,865
Grand total (value of all minerals)			1,615,699		1,818,243		n.p.

MINING AND QUARRYING PRODUCTION, VICTORIA - continued

(a) Excludes the quantity and value of brown coal used for briquette manufacture.
(b) Previously reported in cubic metres, now reported in kilolitres; 1 cubic metre = 1 kilolitre.
(c) Excludes refinery production.
(d) Value shown is an estimate based on prices prescribed in legislation, quoted market prices, and information from the Victorian Department of Minerals and Energy. Values of individual petroleum products are not available for publication.
(e) The year 1980-81 includes aggregate now included under crushed and broken stone.
(f) Includes white clay.

ASSAYED CONTENT OF METALLIC MINERALS, VICTORIA

Metal or element and mineral in which contained	Unit	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
Alumina contained in bauxite Gold contained in gold bullion Iron contained in – bauxite	tonne gm tonne	1,100 9,238 145	963 21,752 138	520 33,709 80	1,677 54,190 89	2,750 77,431 1,375	3,339 93,952 1,670
iron ore Total iron	"	284 429	5,045 5,183	1,075	102	1 375	1 670
Tin contained in tin concentrate	,,	2	1	-	-	-	-

Sources: Department of Minerals and Energy, Victoria, and Australian Bureau of Statistics.

BROWN COAL PRODUCTION AND VALUE (a), VICTORIA

Period	Production	Value	
	tonnes	\$'000	
1977-1978	30,492,186	73,183	
1978-1979	32,896,279	87,641	
1979-1980	32,894,505	101,480	
1980-1981	32,102,983	116,728	
1981-1982	37,561,834	147,476	
1982-1983	34,998,510	158,383	

(a) Value of output at the mine. This is essentially the unit selling price of the commodity, less any unit transport costs from the mine or associated treatment works, multiplied by the production. Where a commodity is transferred to another location for further processing without being sold, the unit value is based on production costs plus an allowance for overhead and profit.

Further references: Groundwater in Victoria, Victorian Year Book 1969, pp.384-6; Victorian clays 1970, pp.376-8; History of the Mines Department, 1970, pp. 105-8; Minerals in Victoria, 1970 pp.1-29; Mineral exploration, 1972, pp.363-7; Geological Survey of Victoria, 1975, pp. 362-3; Extractive industries, 1975, pp.364-5; Mineral deposits in Victoria, 1976, pp.363-3; Mines Department, 1977, pp.367-9; History of mining, 1979, p.287; Mineral production and exploration since 1934, 1984, pp.270-3

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