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4603.0

Environment Protection Mining and Manufacturing Industries

Australia

2000–2001

Environment Protection

Mining and Manufacturing Industries

Australia

2000–01

Susan Linacre
Acting Australian Statistician

AUSTRALIAN BUREAU OF STATISTICS

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PREFACE

This publication presents results, in respect of the 2000–01 financial year, from a survey conducted by the Australian Bureau of Statistics (ABS) of employing businesses involved in the manufacturing and mining industries. The survey was designed to measure the level of environment management activity in manufacturing and mining businesses in Australia.

Statistics on environment management are important because they provide an indication of the impacts of environment policy. This publication contains both financial and physical information from tailored collections of the mining and manufacturing industries. The next survey is expected to be conducted in respect of the 2002–03 financial year.

The ABS welcomes comments and suggestions from users recommending industries and data items for inclusion in future service industries surveys. These comments should be addressed to the Director, Environment and Energy Section, Australian Bureau of Statistics, Locked Bag 10 Belconnen ACT 2616.

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ANZSIC	Australian and New Zealand Standard Industrial Classification
CEPA	Classification of Environment Protection Activities
EMS	Environment Management Systems
GL	gigalitre
ha	hectare
ML	megalitre
$m	million dollars
PAC	Pollution Abatement and Control
PER	Public environment report
RSE	relative standard error
SE	standard error
SEEA	System of Integrated Environmental and Economic Accounting
SNA	System of National Accounts
SERIEE	European System for the Collection of Economic Information on the Environment
$'000	thousand dollars

CHAPTER 1 OVERVIEW

BACKGROUND

This is the sixth in a continuing series of Australian Bureau of Statistics (ABS) publications reporting on expenditure to protect the environment. The ABS first collected environment protection expenditure data in respect of the financial year 1991–92 with subsequent collections in respect of all financial years until 1996–97. The methodology for the environment protection collections until 1994–95 was based on the Pollution Abatement and Control (PAC) framework introduced by the Organisation for Economic Cooperation and Development (OECD). The PAC framework focused solely on the cost of waste management for government, industry and the community.

The redevelopment of the System of National Accounts (SNA) for 1993 gave rise to two environmental accounting frameworks: the System of Integrated Economic and Environmental Accounts (SEEA, 1993) and the European System for the collection of Economic Information on the Environment (SERIEE). The SEEA framework proposed a highly aggregated measurement of the cost of degradation and environment protection. The SERIEE framework proposed a more detailed accounting framework based on the Classification of Environment Protection Activities (CEPA). The SERIEE framework was used as the basis for the 1995–96 and 1996–97 collections and has been used as the basis for the 2000–01 collection for which results are presented in this publication.

The SERIEE framework and CEPA system have been adapted for specific Australian conditions. Most of the changes are to detail such areas as minesite rehabilitation and soil degradation. In essence, a modified CEPA is the basis for the domain structure of the environment protection expenditure reporting for this publication.

The ABS continues to collect and present estimates of environment protection expenditure and income for a number of reasons:

- to provide an indicator of the impact of environment policy and regulation;
- to provide a measure of the demand for environment goods and services;
- they form a part of the SEEA, a satellite accounting system to the SNA;
- to inform policy decisions; and
- to enable the situation in Australia to be compared with that in other countries.

In the most recent development of the environment protection expenditure statistics, a number of changes were introduced. The range of industries covered was limited to mining and manufacturing industries as these are typically the largest consumers of environment protection goods and services. Also, there was an increase in the range of topics that were collected. These new topics introduced a range of physical, eco-efficiency and environmental plan statistics. Any comparisons with previous data should take these changes into account.

BACKGROUND *continued*

Specifically, the 2000–01 collection included financial information such as current environment protection expenditure, capital environment protection expenditure and income from environment protection activities. The financial data were collected by environment domains or the type of degradation that they are addressing. These domains are :

- Solid waste management;
- Liquid waste management;
- Management of air emissions;
- Minesite rehabilitation (for the mining industry); and,
- Other environment management activities including protection of soil resources, protection of biodiversity and habitat, noise and vibration abatement.

The glossary provides definitions of domains and financial data items.

The survey also collected information on physical data, eco-efficiency savings and environmental behaviour of the selected industries. In the mining sector, information on water intake and discharge, land use and minesite rehabilitation was collected. For the manufacturing sector, information on water intake, waste and recycling data were collected.

Information collected on environmental behaviour related to the development of environment management systems (EMS), plans or policies; barriers to implementing EMS; and sources of information. Data on barriers to implementing EMS and sources of information are not in this publication but are avilable on request.

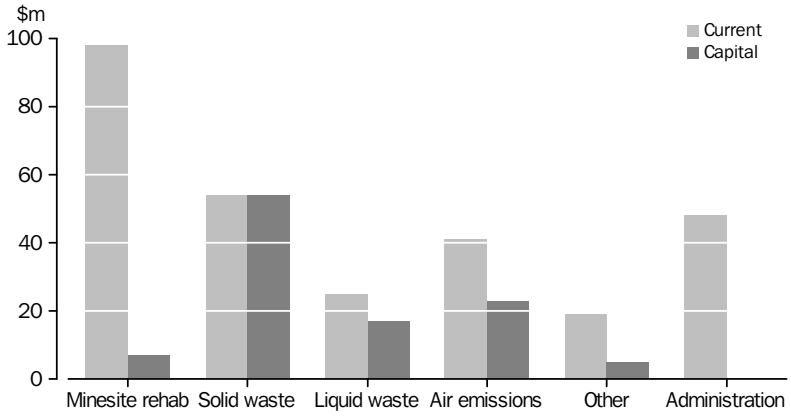
Environment protection reporting in this publication is divided into two chapters covering the mining and manufacturing industries, respectively. Each chapter contains three main components:

- financial data (current and capital environment protection expenditure);
- physical data (water use, land use and rehabilitation, waste and recycling); and,
- eco-efficiency savings and environment plans.

MINING INDUSTRY

Financial data

ENVIRONMENT PROTECTION EXPENDITURE—MINING, By domain



Financial data continued

CURRENT EXPENDITURE

In the mining industry, approximately 65% of businesses had current environment protection expenditure. These businesses spent $284m on payments to government, payments to private organisations and other expenses. Current expenditure on environment management was less than 1% of total current expenses for this industry.

Of this:

- minesite rehabilitation accounted for $98m and solid waste management accounted for $54m;
- metal ore mining (ANZSIC 13) was the subdivision with the highest expenditure ($154m); and,
- Western Australia was the State with the highest expenditure ($105m).

CAPITAL EXPENDITURE

Total capital environment protection expenditure for the mining industry was $107m or 2% of total capital expenditure. Approximately 28% of mining businesses accounted for this amount.

Of this:

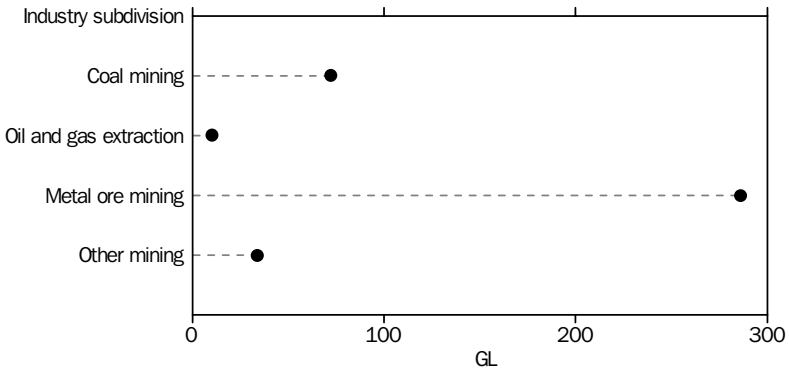
- solid waste management had the highest expenditure ($54m);
- metal ore mining industry (ANZSIC 13) was the subdivision with the highest expenditure ($71m); and,
- Western Australia was the State with the highest expenditure of $61m.

Physical data

WATER USE

Total water intake by the mining industry was 401GL. Of this, mains supplied water accounted for 49GL and self extracted water accounted for 352GL. Total water discharges were 183GL. Mine de-watering contributed to 111GL of water discharges and other discharges accounted for 72GL. Net water use, taking into account water intake and discharges, was 219GL.

WATER INTAKE(a)—MINING, By industry subdivision



(a) Water supplied from mains and self-extracted.

Physical data continued

LAND USE AND REHABILITATION

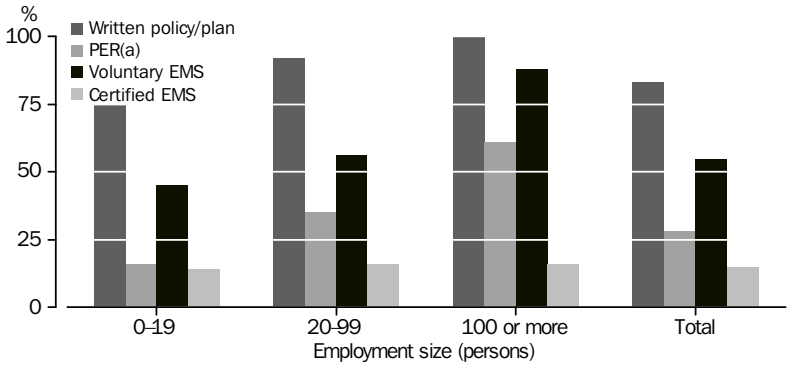
Mining operations in Australia in 2000–01 disturbed approximately 39,347ha of land. Nearly 34,972ha of land was under rehabilitation from past mining activities and over 12,695ha was considered to be rehabilitated to a reasonable approximation of its pre-mining condition.

Eco-efficiency savings and environment plans

Of those businesses that responded with eco-efficiency measures and which could calculate average annual savings, total eco-efficiency savings were estimated at $11m. Energy minimisation savings accounted for $7m and material input savings accounted for $2m.

Around 57% of mining businesses stated that they had an environment policy, plan or environment management system (EMS). Of those reporting environment plans, 82% had a written environment policy or plan and 55% reported a voluntary EMS or code of practice.

TYPES OF ENVIRONMENT PLANS—MINING, By employment size

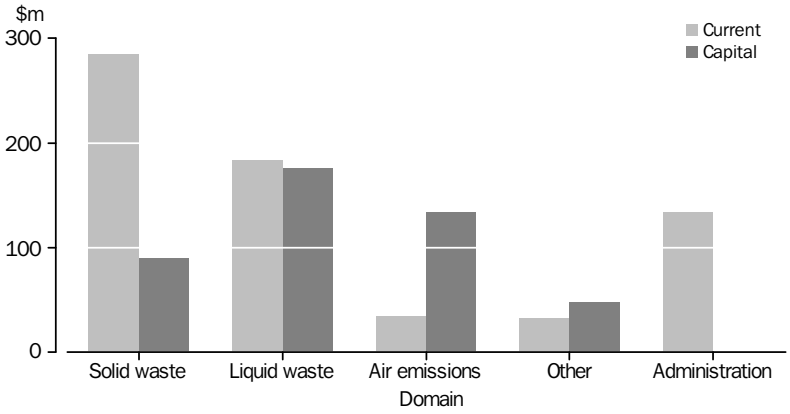


(a) Public Environment Reports.

MANUFACTURING INDUSTRY

Financial data

ENVIRONMENT PROTECTION EXPENDITURE—MANUFACTURING, By domain



CURRENT EXPENDITURE

Total current environment protection expenditure of the manufacturing industry was $668m or less than 0.5% of total current expenditure. Seventy percent of businesses had current environment protection expenditure for the 2000–01 year.

Financial data continued

CURRENT EXPENDITURE *continued*

Of this:

- total current environment protection expenditure on waste management was over $500m;
- food, beverages and tobacco manufacturing (ANZSIC 21) was the subdivision with the highest expenditure ($164m); and,
- New South Wales was the state with the highest expenditure ($212m).

CAPITAL EXPENDITURE

Capital environment protection expenditure accounted for nearly $438m or 4% of total capital expenditure for the manufacturing industry. More than 17% of businesses in the manufacturing industry had capital environment protection expenditure for the 2000–01 financial year.

Of this:

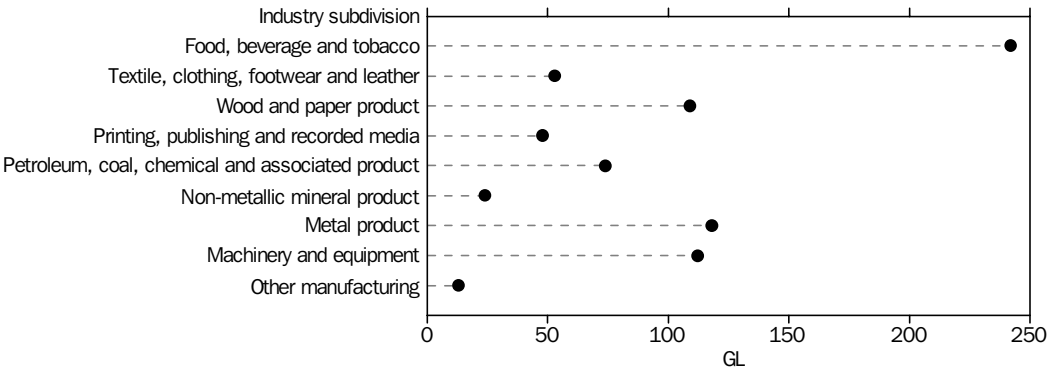
- liquid waste management accounted for $176m;
- metal product manufacturing (ANZSIC 27) was the subdivision with the highest expenditure ($128m); and,
- New South Wales was the state with the highest expenditure ($138m).

Physical data

WATER USE

Water intake by the manufacturing sector accounted for 793GL. Of this, mains supplied water accounted for 560GL and self extracted water accounted for 234GL.

WATER INTAKE(a)—MANUFACTURING, By industry subdivision



(a) Water supplied from mains and self-extracted.

WASTE AND RECYCLING

Approximately 80% of manufacturers generated waste materials. Of those businesses generating waste, metal scrap (82%) was the highest reported material to be recycled.

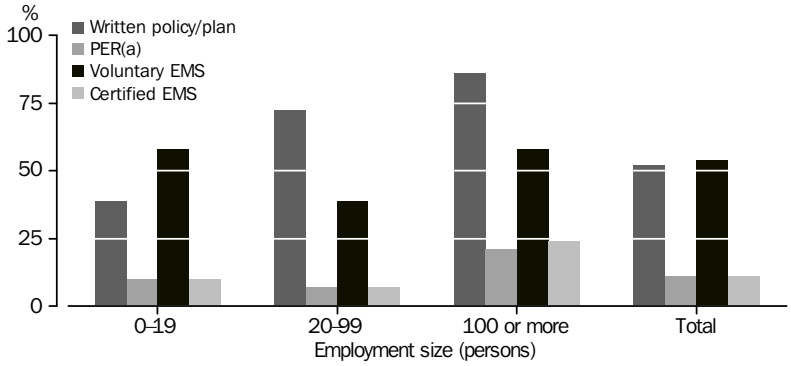
Eco-efficiency savings and environment plans

Of those businesses implementing eco-efficiency measures, total average annual eco-efficiency savings was $93m. Energy savings contributed $32m and material input savings contributed $31m.

Eco-efficiency savings and environment plans continued

Approximately 13% of manufacturers reported an environment plan. Of those reporting environment plans, 54% reported a voluntary EMS or code of practice and 52% had a written environment policy or plan. Some businesses reported more than one environment plan being used for their operations.

TYPES OF ENVIRONMENT PLANS—MANUFACTURING, By employment size

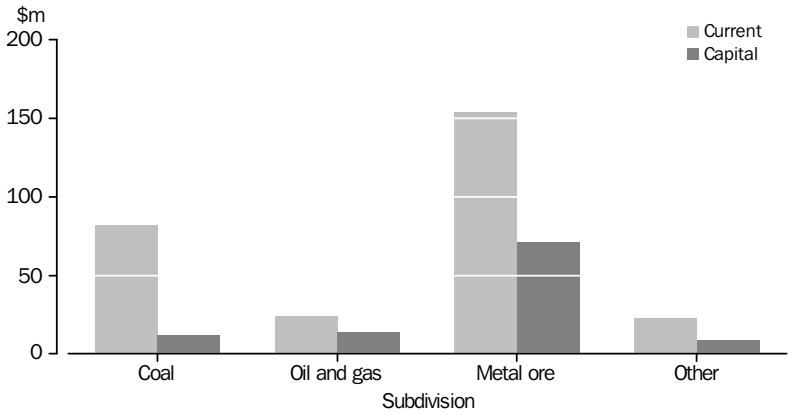


(a) Public Environment Reports.

CHAPTER 2 MINING INDUSTRY

FINANCIAL DATA

ENVIRONMENT PROTECTION EXPENDITURE—MINING, By industry subdivision



Current expenditure

Expenditure on environment protection includes the amounts paid to private and government organisations for services and other expenditure. Included in other expenditure are such items as wages and salaries, purchases of materials, electricity and fuels, operation and maintenance of equipment, and research and development.

The mining industry spent $284m on current environment protection expenditure or less than 1% of total total current expenditure. Just under 66% of mining businesses reported expenditure on a range of expenses such as wages and salaries, payments to private organisations and payments to government.

Expenditure on the environment domains accounted for 83% ($236m) of total current environment protection expenditure. Of this, the two highest contributors were minesite rehabilitation ($98m) and solid waste management ($54m). Administration of environment protection accounted for the remaining $48m (17%).

The metal ore mining subdivision ($154m) reported the highest current environment protection expenditure in the mining industry. Metal ore mining had major expenditure on minesite rehabilitation ($50m) and reducing air emissions ($34m). Coal mining was a significant contributor to minesite rehabilitation ($36m).

Western Australia has some of the largest mining operations in Australia. Accordingly that State had the highest current environment protection expenditure, contributing 37% ($105m) of the total. Approximately one-third ($32m) of expenditure by Western Australia was on minesite rehabilitation and a further $21m on administration of environment protection.

Environment protection expenditure by large mining operations (100 or more employees) was $242m (85%). Minesite rehabilitation ($77m), solid waste management ($46m) and administration ($43m) were the highest expenditure for large businesses.

Capital expenditure

Capital expenditure on environment protection relates to the acquisition of plant, machinery, equipment and land; construction and installation of facilities; and capitalised wages and salaries. Excluded from capital expenditure are those purchases which are only partly used for environment protection.

Capital environment protection expenditure of the mining industry comprised 2% ($107m) of total capital expenditure. Approximately 229 (28%) mining businesses had capital environment protection expenditure on assets such as gross pollutant filters, earth-moving equipment specifically for land rehabilitation or air scrubbers.

Solid waste management accounted for 51% ($54m) of total capital environment protection expenditure for the mining industry. Other major contributions were expenditure on air emissions ($23m) and liquid waste ($17m) management.

Metal ore mining ($71m) accounted for the highest capital expenditure estimates in the mining industry. Of this, solid waste management accounted for $48m and liquid waste accounted for $12m. The oil and gas extraction subdivision had the highest capital expenditure on air emissions ($12m).

Western Australia contributed the highest capital expenditure of the states ($61m). Nearly all of Western Australia's capital environment protection expenditure was on waste product management for either solid ($32m), air ($15m) or liquid ($10m) emissions.

Large businesses (100 or more employees) made up the bulk ($100m) of capital environment protection expenditure for the mining industry. Of this, $51m was for solid waste management facilities and $22m on management of air emissions.

PHYSICAL DATA

Water use

Mining businesses extracted 401GL of water supplied throughout Australia. Of this, 88% was from self extracted sources; the remaining 12% was from mains supplies. Water discharges by this industry were 183GL. Of this, 61% was from mine de-watering.

Metal ore mining had the highest amount of water extraction, contributing to 71% (286GL) of extracted water for the mining industry. Water intake by metal ore mining is more than three times any of the other mining subdivisions.

Land use and rehabilitation

Land use in this context are the areas that have been altered from their pre-mining condition as a result of mining and exploration activities (newly disturbed land). This includes tailings storage, roads, waste rock dumps and other cleared areas. Land rehabilitation is divided into two categories, land under rehabilitation and land rehabilitated to a state that is similar to its pre-mining condition.

For the reporting period, mining operations had 39,347ha of newly disturbed land, 34,972ha of land under rehabilitation and 12,695ha of land rehabilitated to its pre-mining condition. Current expenditure on current and finalised minesite rehabilitation projects was approximately $2,050 per hectare and $145 per hectare for capital expenditure.

Coal mining (20,726ha) accounted for the majority of newly disturbed land for the mining sector. Metal ore mining contributed to the majority of land under rehabilitation (22,559ha) and land rehabilitated to a pre-mining condition (6,152ha).

Land use and rehabilitation continued

Large businesses contributed the highest amounts of newly disturbed land (33,073ha or 84%), land under rehabilitation (29,678ha or 85%) and land rehabilitated to a pre-mining condition (8,603ha or 68%).

ECO-EFFICIENCY SAVINGS AND ENVIRONMENT PLANS

Eco-efficiency savings

Businesses were asked to report on measures which produced goods and services using less energy, water, material inputs and/or waste. These businesses were asked to calculate their savings from these eco-efficiency measures. Data on eco-efficiency savings were collected from a small number of mining businesses and the values contained in this publication should be treated with caution.

Of the businesses that reported implementing eco-efficiency measures (64 businesses in total), total annual savings from eco-efficiency measures were measured at $11m. The majority of savings were from reduction of energy use ($7m) and reduction of material inputs ($2m).

Environment plans

Environment plans for the mining sector are defined as either a written environment policy or plan, a public environment report, a voluntary environment management system or code of practice, and a certified environment management system. Businesses were asked to report on which types of environment plans had been developed for their operations.

Over half of the businesses (57%) had environment management plans as at 30 June 2001. Of those mining businesses that had environment plans, the two most common types were a written policy or plan (83%) and a voluntary environment management systems or code of practice (55%).

Approximately 98% of large businesses reported an environment plan. Of these, all businesses reported a written policy or plan and 88% reported a voluntary environment management system or code of practice.

2.1 MINING BUSINESSES WITH ENVIRONMENT MANAGEMENT ACTIVITY

	Businesses at end June 2001	*Proportion of all businesses*
	no.	%
Current environment protection expenditure	537	65.2
Capital environment protection expenditure	229	27.8
Environment protection income	71	8.6
Environment plans	468	56.7
Eco-efficiency savings	225	27.3
Water intake	504	61.2
Water discharge	146	17.7

2.2 MINING BUSINESSES WITH ENVIRONMENT MANAGEMENT ACTIVITY, By industry subdivision

	INDUSTRY SUBDIVISION				
Environment management activity	*Coal mining*	*Oil and gas extraction*	*Metal ore mining*	*Other mining*	*Total mining*
	%	%	%	%	%
PROPORTION OF TOTAL MINING BUSINESSES WITH:					
Current environment protection expenditure	6.2	2.6	13.8	42.6	65.2
Capital environment protection expenditure	3.4	1.5	7.5	15.4	27.8
Environment protection income	1.5	0.1	1.7	5.3	8.6
Environment plans	6.9	3.2	12.7	33.9	56.7
Eco-efficiency savings	4.2	1.1	7.8	14.2	27.3
PROPORTION OF BUSINESSES IN INDUSTRY SUBDIVISION WITH:					
Current environment protection expenditure	46.5	43.0	72.2	69.1	65.2
Capital environment protection expenditure	24.8	25.4	40.1	24.8	27.8
Environment protection income	11.3	1.9	8.9	8.6	8.6
Environment plans	52.7	52.7	66.4	55.0	56.7
Eco-efficiency savings	32.8	17.4	40.3	23.1	27.3

2.3 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By domain—Mining

	Businesses with expenditure(a)	*Current environment protection expenditure*	*Proportion of total current environment protection expenditure*	*Proportion of total current expenses for all mining businesses*
	no.	$'000	%	%
Domain				
Minesite rehabilitation	426	97 662.1	34.4	0.3
Solid waste	297	53 840.7	19.0	0.2
Liquid waste(b)	254	24 810.4	8.7	0.1
Air emissions	203	40 493.9	14.3	0.1
Other	192	18 972.9	6.7	0.1
Total	*520*	*235 779.9*	*83.1*	*0.7*
Administration	356	48 048.1	16.9	0.1
Total	**537**	**283 828.1**	**100.0**	**0.8**

(a) Businesses may be involved in more than one domain activity, hence the count of businesses may not sum to the total.
(b) Includes waste water.

2.4 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By industry subdivision—Mining

Industry subdivision	*Minesite rehabilitation*	*Solid waste*	*Liquid waste*(a)	*Air emissions*	*Other*	*Administration*	*Total*
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Coal mining	35 800.2	21 219.4	6 274.4	3 957.3	5 772.8	9 400.3	82 424.5
Oil and gas extraction	1 798.4	3 267.2	6 227.1	947.3	3 512.3	7 781.6	23 534.0
Metal ore mining	50 160.0	24 648.4	11 367.8	34 116.6	7 690.8	26 440.1	154 423.8
Other mining	9 903.5	4 705.6	941.0	1 472.7	1 997.0	4 426.0	23 445.8
Total mining	**97 662.1**	**53 840.7**	**24 810.4**	**40 493.9**	**18 972.9**	**48 048.1**	**283 828.1**

(a) Includes waste water.

2.5 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By state—Mining

State	*Minesite rehabilitation* $'000	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Administration* $'000	*Total* $'000
NSW and ACT	18 668.7	20 199.3	2 747.1	4 608.1	4 592.1	9 586.6	60 402.0
Vic.	3 429.2	1 690.1	1 110.7	804.5	733.6	1 935.3	9 703.4
Qld	37 692.0	8 410.6	7 488.9	np	np	10 636.4	71 963.6
SA	1 180.9	1 724.9	np	np	np	1 950.9	np
WA	31 517.7	18 673.9	10 398.9	15 357.0	7 995.9	21 413.8	105 357.2
Tas.	1 005.9	2 106.9	np	105.2	749.2	1 117.0	np
NT	4 167.7	1 035.0	926.1	655.3	628.6	1 408.2	8 820.9
Aust.	**97 662.1**	**53 840.7**	**24 810.4**	**40 493.9**	**18 972.9**	**48 048.1**	**283 828.1**

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes waste water.

2.6 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By employment size—Mining

Employment size (persons)	*Minesite rehabilitation* $'000	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Administration* $'000	*Total* $'000
0–19	7 894.6	1 802.9	695.0	831.4	447.1	2 118.1	13 789.0
20–99	12 283.9	6 033.1	3 095.3	1 763.9	1 401.2	3 092.3	27 669.7
100 or more	77 483.6	46 004.7	21 020.2	37 898.7	17 124.6	42 837.7	242 369.4
Total	**97 662.1**	**53 840.7**	**24 810.4**	**40 493.9**	**18 972.9**	**48 048.1**	**283 828.1**

(a) Includes waste water.

2.7 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By domain—Mining

Domain	Businesses with expenditure(a)	Capital environment protection expenditure	Proportion of total environment protection expenditure	Proportion of total capital expenditure for all mining businesses
	no.	$'000	%	%
Minesite rehabilitation	100	7 352.6	6.9	0.2
Solid waste	95	54 155.3	50.7	1.1
Liquid waste(b)	90	17 278.3	16.2	0.4
Air emissions	87	23 110.2	21.6	0.5
Other	43	4 873.5	4.6	0.1
Total	**229**	**106 770.0**	**100.0**	**2.2**

(a) Businesses may be involved in more than one domain activity, hence the count of businesses may not sum to the total.

(b) Includes waste water.

2.8 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By industry subdivision—Mining

Industry subdivision	Minesite rehabilitation	Solid waste	Liquid waste(a)	Air emissions	Other	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Coal mining	np	3 412.0	4 414.5	np	np	11 630.2
Oil and gas extraction	np	459.0	840.0	np	np	14 476.5
Metal ore mining	4 377.5	47 709.0	11 621.2	4 729.3	3 019.0	71 456.1
Other mining	1 238.5	2 575.3	402.6	4 656.2	334.4	9 207.2
Total mining	**7 352.6**	**54 155.3**	**17 278.3**	**23 110.2**	**4 873.5**	**106 770.0**

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes waste water.

2.9 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By state—Mining

State	*Minesite rehabilitation* $'000	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Total* $'000
NSW and ACT	1 816.1	6 222.4	1 862.6	1 617.1	685.3	12 203.5
Vic.	*108.6	70.8	np	629.3	np	1 008.3
Qld	np	10 897.8	4 149.8	np	1 881.0	24 912.3
SA	11.9	248.6	np	np	np	931.2
WA	1 671.5	32 366.1	9 773.3	15 101.7	1 826.0	60 738.6
Tas.	np	2 187.3	np	115.1	np	3 272.4
NT	97.0	2 162.3	np	np	309.7	3 703.8
Aust.	**7 352.6**	**54 155.3**	**17 278.3**	**23 110.2**	**4 873.5**	**106 770.0**

* estimate is subject to sampling variability too high for most practical purposes

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes waste water.

2.10 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By employment size—Mining

Employment size (persons)	*Minesite rehabilitation* $'000	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Total* $'000
0–19	631.4	364.6	278.5	*109.7	*61.3	1 445.6
20–99	806.1	2 682.2	146.9	1 135.7	300.7	5 071.6
100 or more	5 915.1	51 108.5	16 852.9	21 864.7	4 511.5	100 252.8
Total	**7 352.6**	**54 155.3**	**17 278.3**	**23 110.2**	**4 873.5**	**106 770.0**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes waste water.

2.11 VOLUME OF WATER INTAKE AND DISCHARGE, By industry subdivision—Mining

	WATER INTAKE			WATER DISCHARGED OFF SITE		
Industry subdivision	*Mains supplied* ML	*Extracted* ML	*Total* ML	*Mine de-watering* ML	*Other* ML	*Total* ML
Coal mining	14 701.3	57 297.5	71 998.8	49 174.8	6 878.1	56 052.8
Oil and gas extraction	1 345.6	8 715.7	10 061.2	np	np	26 421.8
Metal ore mining	31 361.7	254 223.6	285 585.3	52 659.2	38 623.2	91 282.3
Other mining	1 787.5	31 968.5	33 756.0	np	np	9 137.9
Total mining	**49 196.1**	**352 205.3**	**401 401.3**	**111 387.7**	**71 507.2**	**182 894.8**

np not available for publication but included in totals where applicable, unless otherwise indicated

2.12 LAND USE AND MINESITE REHABILITATION—Mining

Description	*Newly disturbed land* ha	*Land under rehabilitation* ha	*Land completely rehabilitated* ha	*Current expenditure on minesite rehabilitation* $'000
Industry				
Coal mining	20 726	10 013	4 858	35 800.2
Oil and gas extraction	np	261	np	1 798.4
Metal ore mining	16 471	22 559	6 152	50 160.0
Other mining	np	2 139	np	9 903.5
Total mining	*39 347*	*34 972*	*12 695*	*97 662.1*
Employment size (persons)				
0–19	*4 045	3 468	3 013	7 894.6
20–99	2 229	1 826	1 079	12 283.9
100 or more	33 073	29 678	8 603	77 483.6
Total	*39 347*	*34 972*	*12 695*	*97 662.1*

np not available for publication but included in totals where applicable, unless otherwise indicated

* estimate has a relative standard error of between 25% and 50% and should be used with caution

2.13 TOTAL SAVINGS FROM ECO-EFFICIENCY MEASURES(a)—Mining

	Total savings
	$'000
Energy	6 900.7
Water	1 225.1
Material input	2 090.2
Waste minimisation	1 137.8
Total	**11 353.8**

(a) For the 64 businesses that were able to estimate savings, the above data represents total annual savings resulting directly from measures implemented over an average of the three years to June 2001.

2.14 MINING BUSINESSES WITH ENVIRONMENT PLANS, By employment size

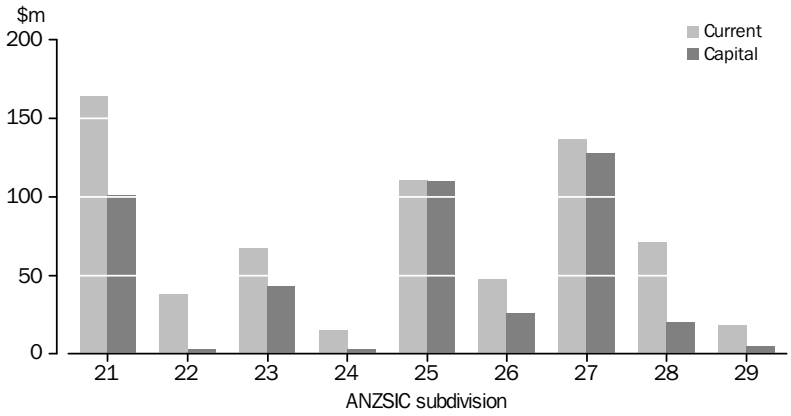
			OF BUSINESSES WITH ENVIRONMENT PLANS, PERCENTAGE WITH:			
	With environment plans	*Without environment plans*	*Written policy or plan*	*Public environment report*	*Voluntary EMS*	*Certified EMS*
	%	%	%	%	%	%
0–19	47.0	53.0	74.8	16.1	45.1	14.8
20–99	87.0	13.0	91.5	35.1	56.0	16.4
100 or more	97.6	*2.4	100.0	60.7	88.1	16.2
Total	**56.7**	**43.3**	**82.3**	**27.8**	**55.3**	**15.3**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

CHAPTER 3 MANUFACTURING INDUSTRY

FINANCIAL DATA

ENVIRONMENT PROTECTION EXPENDITURE—MANUFACTURING, By subdivision



Current expenditure

Expenditure on environment protection for manufacturing businesses is determined by the amounts paid to private and government organisations for services.

Manufacturing businesses had $668m in current environment protection expenditure, or less than 0.5% of total manufacturing expenses. 70% of manufacturing businesses were estimated to have environment protection expenditure.

Expenditure on waste management accounted for $502m. Of this, solid waste management accounted for $284m and liquid waste management accounted for $183m. Administration of environment management activities also contributed $134m.

Food, beverages and tobacco manufacturing accounted for the highest subdivision expenditure ($164m). Of this, solid waste management accounted for $68m and liquid waste accounted for $57m. The highest administration expenditure was metal products manufacturing ($35m).

New South Wales was the state with the highest expenditure ($212m). Of this, solid waste management accounted for $101m and administration accounted for $50m. Victoria had the highest expenditure on liquid waste ($70m).

Large businesses (100 or more employees) spent the most on environment protection, contributing 72% ($482m) of total current environment protection expenditure for the manufacturing industry. Over half of this amount ($191m) was spent on solid waste management.

Capital expenditure

Capital expenditure on environment protection relates to acquisition of plant, machinery, equipment and land, construction and installation of facilities; and capitalised wages and salaries. Excluded from capital expenditure are those purchases which are only partly used for environment protection.

Capital expenditure continued

Environment protection capital expenditure accounted for nearly 4% ($438m) of the total capital expenditure for the manufacturing industry. Over 17% of businesses in the industry were estimated to have some capital expenditure.

Approximately 89% ($390m) of capital environment protection expenditure was recorded on waste management, of which liquid waste management contributed $176m and air emissions management contributed $124m.

Of the industry subdivisions, metal product manufacturing had the highest capital environment protection expenditure ($128m). Of this, management of air emissions accounted for $52m and solid waste management accounted for $34m. Petroleum, coal, chemical and associated product manufacturing had the highest capital expenditure on liquid waste management ($58m).

Manufacturing businesses in New South Wales and Victoria reported the highest capital expenditure on environment assets ($138m and $113m, respectively). Businesses in New South Wales expended most of their capital expenditure on air emissions management ($53m) and liquid waste and waste water management ($45m). Similarly businesses in Victoria had high contributions on liquid waste and waste water management ($56m) and air emissions management ($30m).

Capital expenditure by large sized businesses (100 or more employees) exceeded that of small and medium sized businesses. Large businesses contributed almost 86% ($376m) of total capital environment protection expenditure. For those businesses liquid waste management accounted for $155m and management of air emissions $108m.

PHYSICAL DATA

Water Use

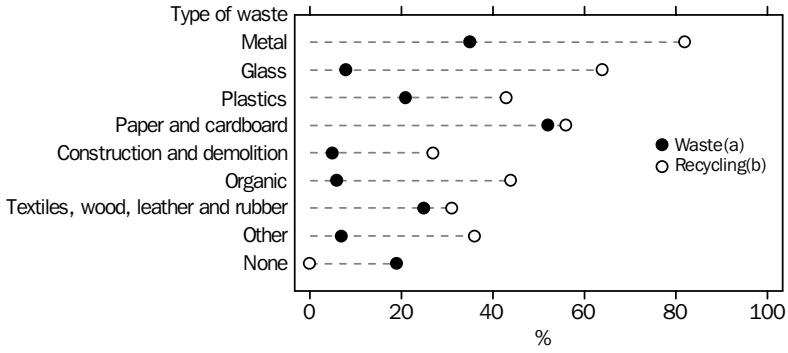
Manufacturing businesses had a water intake of 793GL. Seventy percent (560GL) of all water used by manufacturers was mains supplied.

Food, beverage and tobacco manufacturing had the highest water intake (242GL). Of this, mains supplied accounted for 119GL and self extracted accounted for 123GL.

Waste and recycling

The main type of waste produced by manufacturers was paper and cardboard derived from inputs into the manufacturing process (52% of all businesses) Of the waste types generated, metal scrap was the most recycled form of waste material with 82% of all manufacturers with that type of waste reporting metal scrap recycling.

WASTE HANDLING—MANUFACTURING, By type of waste



(a) Percentage of business producing waste.
(b) Percentage of business with the waste who recycled.

ECO-EFFICIENCY SAVINGS AND ENVIRONMENT PLANS

Eco-efficiency savings

Businesses were asked to report on measures which produced goods and services using less energy, water, material inputs and/or waste. The businesses with these measures were asked to calculate the savings arising from these eco-efficiency measures. Data on eco-efficiency savings were collected from a small number of manufacturing businesses and the values contained in this publication should be treated with caution.

Total savings from eco-efficiency measures were reported to be $93m from 2,177 businesses reporting that they could measure eco-efficiency savings. Energy ($32m) and material input ($31m) savings gave the highest savings on eco-efficiency measures.

Environment plans

Environment plans for the manufacturing industry are defined as either a written environment policy or plan, a public environment report, a voluntary environment management system or code of practice, and a certified environment management system. Businesses were asked to report on which types of environment plans were developed for their operations.

About 13% of manufacturers had some sort of environment plan. The vast majority of these plans were in the form of written policies or plans (52%) or through voluntary environment management systems (54%).

The percentage of businesses reporting environment plans was highest among large businesses at 63%. Of these, 86% reported a written policy or plan and 58% reported a voluntary environment management system or code of practice.

3.1 MANUFACTURING BUSINESSES WITH ENVIRONMENT MANAGEMENT ACTIVITY

	Businesses at end June 2001	*Proportion of all businesses*
	no.	%
Current environment protection expenditure	35 146	70.0
Capital environment protection expenditure	8 670	17.3
Environment protection income	6 716	13.4
Environment plans	6 727	13.4
Eco-efficiency savings	6 910	13.8
Recycling	27 852	55.5
Water intake	42 751	85.1

3.2 MANUFACTURING BUSINESSES WITH ENVIRONMENT MANAGEMENT ACTIVITY, By industry subdivision

Environment management activity	*Food, beverages and tobacco* %	*Textile, clothing, footwear and leather* %	*Wood and paper products* %	*Printing, publishing and recorded media* %	*Petroleum, coal, chemical and associated products* %	*Non-metallic mineral products* %
PROPORTION OF TOTAL MANUFACTURING BUSINESSES WITH:						
Current environment protection expenditure	5.5	6.5	6.4	6.9	4.9	3.0
Capital environment protection expenditure	1.8	*0.5	*1.5	1.0	1.8	1.0
Environment protection income	*0.5	*0.1	*0.8	1.3	*1.2	*0.3
Environment plans	2.0	*0.5	*0.8	1.0	1.8	0.3
Eco-efficiency savings	2.3	*0.6	*0.8	1.5	1.8	*0.5
Recycling	4.0	4.4	4.1	7.2	3.5	1.1
PROPORTION OF BUSINESSES IN INDUSTRY SUBDIVISION WITH:						
Current environment protection expenditure	74.3	66.5	72.1	60.2	76.4	77.9
Capital environment protection expenditure	21.8	*5.0	*16.4	8.7	26.6	25.0
Environment protection income	*6.9	*1.4	*8.6	11.5	*19.0	*7.2
Environment plans	26.0	*6.2	*10.2	9.9	27.5	10.5
Eco-efficiency savings	29.0	*6.5	*8.6	12.9	28.7	*13.4
Recycling	56.8	45.2	45.3	63.0	56.9	28.5

* estimate has a relative standard error of between 25% and 50% and should be used with caution

3.2 MANUFACTURING BUSINESSES WITH ENVIRONMENT MANAGEMENT ACTIVITY, By industry subdivision *continued*

Environment management activity	*Metal products* %	*Machinery and equipment* %	*Other manufacturing* %	*Total manufacturing* %
PROPORTION OF TOTAL MANUFACTURING BUSINESSES WITH:				
Current environment protection expenditure	12.5	13.0	11.3	70.0
Capital environment protection expenditure	*3.3	*4.0	2.4	17.3
Environment protection income	*4.7	*3.6	0.9	13.4
Environment plans	*3.0	*3.0	1.0	13.4
Eco-efficiency savings	*2.6	*2.2	1.5	13.8
Recycling	12.5	12.1	6.6	55.5
PROPORTION OF BUSINESSES IN INDUSTRY SUBDIVISION WITH:				
Current environment protection expenditure	72.8	63.8	76.9	70.0
Capital environment protection expenditure	*20.0	*20.2	17.0	17.3
Environment protection income	*26.8	*17.8	6.2	13.4
Environment plans	*17.9	*12.4	7.4	13.4
Eco-efficiency savings	*15.4	*11.1	10.3	13.8
Recycling	71.9	58.7	44.7	55.5

* estimate has a relative standard error of between 25% and 50% and should be used with caution

3.3 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By domain—Manufacturing

	Businesses with expenditure(a) no.	*Current environment protection expenditure* $'000	*Proportion of total current environment protection expenditure* %	*Proportion of total current expenses for all manufacturing businesses* %
Domain				
Solid waste	32 536	284 025.0	42.5	0.1
Liquid waste(b)	10 540	183 469.6	27.4	0.1
Air emissions	2 634	34 452.3	5.2	—
Other	*1 765	32 707.5	4.9	—
Total	*34 875*	*534 654.4*	*80.0*	*0.3*
Administration	6 938	133 795.2	20.0	0.1
Total	**35 146**	**668 449.6**	**100.0**	**0.3**

— nil or rounded to zero (including null cells)

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Businesses may be involved in more than one domain activity, hence the count of businesses may not sum to the total.

(b) Includes waste water.

3.4 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By industry subdivision—Manufacturing

Industry subdivision	Solid waste $'000	Liquid waste(a) $'000	Air emissions $'000	Other $'000	Administration $'000	Total $'000
Food, beverages and tobacco	68 489.4	57 348.0	3 014.6	4 984.5	30 603.4	164 439.9
Textiles, clothing, footwear and leather	15 710.3	17 536.9	607.8	403.6	3 547.2	37 805.8
Wood and paper products	35 482.3	15 208.8	6 153.9	2 565.6	7 553.0	66 963.5
Printing, publishing and recorded media	8 951.3	3 189.4	350.9	287.9	2 605.0	15 384.6
Petroleum, coal, chemical and associated products	36 705.6	37 741.2	4 222.6	7 451.9	24 890.5	111 011.8
Non-metallic mineral products	22 827.7	6 305.0	5 102.1	6 985.6	6 679.0	47 899.5
Metal products	56 944.0	25 595.0	12 451.0	*6 347.9	35 217.0	136 554.9
Machinery and equipment	25 687.8	19 336.2	1 966.3	3 346.3	20 522.4	70 858.9
Other manufacturing	13 226.5	1 209.1	*583.1	*334.2	2 177.7	17 530.6
Total manufacturing	**284 025.0**	**183 469.6**	**34 452.3**	**32 707.5**	**133 795.2**	**668 449.6**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes waste water.

3.5 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By state—Manufacturing

State	Solid waste $'000	Liquid waste(a) $'000	Air emissions $'000	Other $'000	Administration $'000	Total $'000
NSW	100 716.1	41 352.4	10 854.4	9 128.7	50 183.0	212 234.6
Vic.	81 614.5	69 952.1	9 961.1	6 530.1	31 654.2	199 712.0
Qld	38 650.1	25 739.5	4 316.6	4 729.3	15 748.6	89 184.1
SA	25 660.4	10 984.7	2 053.5	2 979.0	13 415.4	55 093.0
WA	24 877.2	26 061.7	4 614.2	*6 901.6	16 308.2	78 762.9
Tas.	6 679.9	7 243.0	np	np	3 758.9	21 560.6
NT	np	np	np	np	np	np
ACT	np	np	74.7	8.9	np	np
Aust.	**284 025.0**	**183 469.6**	**34 452.3**	**32 707.5**	**133 795.2**	**668 449.6**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes waste water.

3.6 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By employment size—Manufacturing

Employment size (persons)	Solid waste $'000	Liquid waste(a) $'000	Air emissions $'000	Other $'000	Administration $'000	Total $'000
0–19	46 643.8	12 975.6	*1 854.3	*1 225.4	14 938.7	77 637.7
20–99	46 144.4	29 329.6	3 468.5	*4 513.2	24 943.1	108 398.7
100 or more	191 236.7	141 164.5	29 129.6	26 968.9	93 913.4	482 413.1
Total	**284 025.0**	**183 469.6**	**34 452.3**	**32 707.5**	**133 795.2**	**668 449.6**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes waste water.

3.7 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By domain—Manufacturing

Domain	Businesses with expenditure(a) no.	Capital environment protection expenditure $'000	Proportion of total capital environment protection expenditure %	Proportion of total capital expenditure for all manufacturing businesses %
Solid waste	5 182	90 314.6	20.6	0.7
Liquid waste(b)	2 237	176 079.4	40.2	1.4
Air emissions	2 729	123 993.9	28.3	1.0
Other	*1 359	47 721.0	10.9	0.4
Total	**8 670**	**438 108.9**	**100.0**	**3.5**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Businesses may be involved in more than one domain activity, hence the count of businesses may not sum to the total.

(b) Includes waste water.

3.8 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By industry subdivision—Manufacturing

Industry subdivision	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Total* $'000
Food, beverages and tobacco	14 674.4	45 994.3	24 566.9	15 495.4	100 731.0
Textiles, clothing, footwear and leather	1 181.7	1 302.1	*489.6	292.2	3 265.6
Wood and paper products	9 237.2	21 569.2	8 456.1	3 293.2	42 555.7
Printing, publishing and recorded media	1 407.9	827.4	303.6	304.6	2 843.5
Petroleum, coal, chemical and associated products	13 841.7	57 821.8	26 223.0	11 763.7	109 650.1
Non-metallic mineral products	9 173.5	7 410.8	7 389.0	2 128.4	26 101.7
Metal products	33 922.3	32 785.5	51 749.8	9 416.1	127 873.7
Machinery and equipment	*4 708.8	*7 760.6	3 317.7	4 389.9	20 177.1
Other manufacturing	2 167.0	*607.7	*1 498.3	*637.6	4 910.6
Total manufacturing	**90 314.6**	**176 079.4**	**123 993.9**	**47 721.0**	**438 108.9**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes waste water.

3.9 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By state—Manufacturing

State	*Solid waste* $'000	*Liquid waste*(a) $'000	*Air emissions* $'000	*Other* $'000	*Total* $'000
NSW	22 245.7	45 200.5	53 080.5	17 805.8	138 332.5
Vic.	16 836.0	56 284.2	30 460.0	9 067.0	112 647.2
Qld	14 218.0	23 451.2	17 385.8	7 535.9	62 590.8
SA	4 588.9	28 301.2	6 665.0	3 942.3	43 497.4
WA	29 855.1	10 483.0	6 161.7	7 095.5	53 595.4
Tas.	2 030.3	np	8 716.2	np	np
NT	344.2	np	np	np	np
ACT	*196.4	65.5	np	np	355.9
Aust.	**90 314.6**	**176 079.4**	**123 993.9**	**47 721.0**	**438 108.9**

np not available for publication but included in totals where applicable, unless otherwise indicated

* estimate has a relative standard error of between 25% and 50% and should be used with caution

(a) Includes waste water.

3.10 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE, By employment size—Manufacturing

Employment size (persons)	Solid waste $'000	Liquid waste(a) $'000	Air emissions $'000	Other $'000	Total $'000
0–19	8 556.5	*5 238.4	**8 159.8	*2 149.6	24 104.3
20–99	10 250.6	*15 380.8	7 364.6	*4 660.5	37 656.4
100 or more	71 507.5	155 460.2	108 469.5	40 910.9	376 348.1
Total	**90 314.6**	**176 079.4**	**123 993.9**	**47 721.0**	**438 108.9**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

(a) Includes waste water.

3.11 VOLUME OF WATER INTAKE, By industry subdivision—Manufacturing

Industry subdivision	WATER INTAKE		
	Mains supplied ML	Extracted ML	Total ML
Food, beverages and tobacco	118 573.3	*123 132.7	241 706.0
Textiles, clothing, footwear and leather	52 685.2	**499.9	53 185.0
Wood and paper products	78 908.7	*29 920.4	108 829.1
Printing, publishing and recorded media	48 150.9	**76.9	48 227.8
Petroleum, coal, chemical and associated products	65 621.4	8 854.5	74 475.9
Non-metallic mineral products	8 916.6	15 501.1	24 417.8
Metal products	66 158.5	51 686.9	117 845.4
Machinery and equipment	*108 451.8	**3 204.6	*111 656.3
Other manufacturing	12 286.7	**572.2	12 858.9
Total manufacturing	**559 753.0**	**233 449.3**	**793 202.3**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

3.12 MANUFACTURING BUSINESSES GENERATING AND RECYCLING SOLID WASTE TYPES

Solid waste	*Proportion of businesses generating waste type* %	*Proportion of businesses recycling non-hazardous solid waste*(a) %
Metal	35.1	82.0
Glass	7.9	64.7
Plastics	21.0	42.8
Paper and cardboard	51.8	56.4
Construction and demolition	4.9	27.4
Organic	6.2	43.6
Textiles, wood, leather and rubber	24.7	31.1
Other	7.0	36.3
None	19.0	. .

. . not applicable
(a) Of those generating waste type.

3.13 TOTAL SAVINGS FROM ECO-EFFICIENCY MEASURES(a)—Manufacturing

	Total savings $'000
Energy	32 129.5
Water	9 284.7
Material input	30 961.9
Waste minimisation	20 510.1
Total	**92 886.2**

(a) For the 2,177 businesses that were able to estimate savings, the above data represent total annual savings resulting directly from measures implemented over an average of the three years to June 2001.

3.14 MANUFACTURING BUSINESSES WITH ENVIRONMENT PLANS, By employment size

			OF BUSINESSES WITH ENVIRONMENT PLANS, PERCENTAGE WITH:			
Employment size (persons)	*With environment plans* %	*Without environment plans* %	*Written policy or plan* %	*Public environment report* %	*Voluntary EMS* %	*Certified EMS* %
0–19	10.2	89.8	39.4	*10.4	57.9	*9.8
20–99	28.3	71.7	72.0	*7.1	39.2	*7.3
100 or more	63.3	36.7	86.0	21.1	58.0	24.2
Total	**13.4**	**86.6**	**52.0**	***11.0**	**54.0**	***11.0**

* estimate has a relative standard error of between 25% and 50% and should be used with caution

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents results from the 2000–01 survey of Environment Management conducted by the ABS in respect of the manufacturing and mining industries.

SCOPE

2 The scope of the survey covered all employing businesses classified to the following subdivisions of the 1993 edition of the Australian and New Zealand Standard Industrial Classification (ANZSIC):

- Mining (Division B)
  - 11 Coal mining
  - 12 Oil and gas extraction
  - 13 Metal ore mining
  - 14 Other mining
- Manufacturing (Division C)
  - 21 Food, beverage and tobacco manufacturing
  - 22 Textile, clothing, footwear and leather manufacturing
  - 23 Wood and paper manufacturing
  - 24 Printing, publishing and recorded media
  - 25 Petroleum, coal, chemical and associated product manufacturing
  - 26 Non-metallic mineral product manufacturing
  - 27 Metal product manufacturing
  - 28 Machinery and equipment manufacturing
  - 29 Other manufacturing

STATISTICAL UNIT

3 The unit for which statistics were reported in the survey was the management unit. The management unit is the highest level producing unit within a business, having regard for industry homogeneity, for which detailed accounts are maintained.

REFERENCE PERIOD

4 Data contained in the tables in this publication relate to manufacturing and mining businesses within the survey scope (see paragraph 2), which operated in Australia at any time during the year ended June 2001. Counts of businesses, numbers of employees and information relating to environmental plans include only those businesses that were operating at 30 June 2001.

BUSINESSES CEASED DURING THE YEAR

5 A very small number of businesses ceased operations during the 2000–01 reference period. As is normal ABS procedure, the contributions of these establishments are included in the survey output.

RELIABILITY OF DATA

6 The estimates in this publication are subject to sampling and non-sampling errors.

SAMPLING ERRORS

7 Since the estimates in this publication are based on information obtained from a sample drawn from units in the survey population, the estimates are subject to sampling variability. That is, they may differ from figures that would have been obtained if all units had been included in the survey. One measure of the likely difference is given by the standard error (SE), which indicates the extent to which an estimate might have varied by chance because only a sample of units was included. There are about two chances in three that a sample

SAMPLING ERRORS *continued*

estimate will differ by less than one SE from the figure that would have been obtained if a census had been conducted, and approximately 19 chances in 20 that the difference will be less than two SEs.

8 Sampling variability can be measured by the relative standard error (RSE) which is obtained by expressing the standard error as a percentage of the estimate to which it refers. The RSE is a useful measure in that it provides an immediate indication of the percentage errors likely to have occurred due to sampling, and this avoids the need to refer also to the size of the estimate.

9 The following table contains estimates of RSEs for a selection of the statistics presented in this publication.

RELATIVE STANDARD ERRORS FOR TABLE 2.3 CURRENT ENVIRONMENT PROTECTION EXPENDITURE, By domain—Mining

	Businesses with expenditure	*Current environment protection expenditure*	*Proportion of total current environment protection expenditure*	*Proportion of total current expenses for all mining businesses*
	%	%	%	%
Domain				
Minesite rehabilitation	4.05	1.37	0.64	1.30
Solid waste	4.84	0.59	0.92	0.95
Liquid waste	4.56	0.49	0.90	0.92
Air emissions	5.83	2.84	2.12	2.64
Other	5.42	1.46	1.49	1.57
Total	*3.42*	*1.04*	*0.15*	*1.01*
Administration	4.36	0.68	0.74	0.96
Total	**3.31**	**0.93**	**—**	**0.94**

— nil or rounded to zero (including null cells)

10 As an example of the above, an estimate of current environment protection expenditure for air emissions is $40.5m and the RSE is 2.84% giving a standard error of $1.15m. Therefore, there would be 2 chances in 3 that, if all units had been included in the survey, a figure within the range of $39.35m to $41.65m would have been obtained and 19 chances in 20 that the figure would have been within the range of $38.2m to $42.8m (a confidence interval of 95%)

11 Where the RSE of an estimate included in this publication exceeds 25%, it has been annotated with an asterisk (*) as a warning to users. Where the RSE of an estimate exceeds 50%, it has been annotated with a double asterisk (**).

NON-SAMPLING ERRORS

12 Errors other than those due to sampling may occur because of deficiencies in the list of units from which the sample was selected, non-response, and imperfections in reporting by providers. Inaccuracies of this kind are referred to as non-sampling error, which may occur in any collection, whether it be a census or a sample. Every effort has been made to reduce non-sampling error to a minimum by careful design and testing of questionnaires, operating procedures and systems used to compile the statistics.

FRAMEWORK

13 ABS environment protection and management statistics draw on the Classification of Environment Protection Activities (CEPA). This classification covers a range of broad guidelines on classifying environment protection activities. The CEPA is modified to suit Australian conditions such as the addition of minesite rehabilitation as it is a major component of environment protection expenditure. Additions to previous surveys include physical questions such as: land use and rehabilitation; water intake and discharge; and, generation of waste types and recycling.

RELEASE OF ADDITIONAL INFORMATION

14 As well as the statistics included in this publication, other unpublished data from the environment management survey are also available on request. For information on the provision of unpublished data please contact Bob Harrison on 02 6252 7369.

ACKNOWLEDGMENT

15 ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated; without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence, as required by the *Census and Statistics Act 1905*.

GLOSSARY

Administration of environment management activities — This item includes policy development and implementation, development of environment management standards and systems, internal and external reporting, environmental auditing, obtaining environment-related permits, employee training and education.

Air emissions management — This item refers to the construction, maintenance or operation of facilities aimed at the reduction or control of emissions (including odours) into the ambient air. Included are measures to control the emissions of greenhouse gases e.g. carbon dioxide, methane and oxides of nitrogen and sulphur, and gases that adversely affect the atmospheric ozone layer e.g. Chlorofluorocarbon's (CFC's) and halons. This excludes measures undertaken for employee health and safety.

Average annual savings — For those businesses reporting the implementation of measures for energy, water or material input savings or waste minimisation during the past three years, the average annual savings resulting directly from such measures during the past three years.

Business size — This item is a measure based on employment size, where small refers to those businesses employing 1–19 persons, medium refers to those employing 20–99 persons, and large refers to those businesses employing 100+ persons.

Capital expenditure — This item refers to the sum of outlays for the purchase of produced assets by the business during the reference period. It includes expenditure on the acquisition of plant machinery, equipment and land; and capitalised wages and salaries.

Certified EMS — This item refers to an Environment Management System that has been certified by an independent body to an external standard, such as the International Standards Organisation's environment series e.g. ISO 14000.

Disturbed land — This item refers to land that has been altered in any way from its pre-mining condition as a result of exploration, prospecting, mining or quarrying operations or ancillary activities. This includes infrastructure and equipment, tailings storages, roads, waste rock dumps, other cleared areas, pits and ramps.

Domain — This item refers to major category headings within the internationally recognised Classification for Environment Protection Activities (CEPA). This is used as the basis for classifying expenditure on environment protection goods and services. The domains used in this survey are minesite rehabilitation (mining industry only), solid waste, liquid waste and waste water, air emissions, administration and other environment management.

Eco-efficiency — This item refers to a combination of economic and ecological efficiency measures that are implemented to minimise the use of natural resources and minimise the production of waste materials. The eco-efficiency measures reported here are: energy savings; water savings; material input savings; and savings from waste minimisation.

Employees — Employees are all persons working for the business who receive remuneration in any part of the reference period, excluding working proprietors and partners.

Environment Management System (EMS) — This item refers to a comprehensive set of guidelines for managing environmental performance and activities which integrates environmental management into daily operations, long-term planning and other quality management systems.

Environment management activity	This item refers to activity carried out by a business relating to the use of resources.
Income from environment management activities	This item includes income from sales of solid and liquid waste recyclables and by-products, income from environment services provided to other organisations and government subsidies and grants for environment management activities.
Land under rehabilitation	This item refers to land which has been partly rehabilitated but is not yet a reasonable approximation to its pre-mining condition.
Land completely rehabilitated	This item refers to land rehabilitated to a reasonable approximation of its pre-mining condition.
Liquid waste and waste water management	This item refers to the storage, handling, treatment, transport, re-use, recycling and/or disposal of hazardous and non-hazardous liquid wastes and waste water. These are wastes which are of no further immediate value for the purpose for which they were used or produced because of the quality, quantity or timing of their occurrence in manufacturing processes. Liquid waste and waste water includes liquid recyclables and by-products.
Manufacturing industry	This industry is as defined by division C of the Australian and New Zealand Standard Industrial Classification, 1993.
Minesite rehabilitation	This item refers to an act of restoring or rehabilitating a site or part of a site to a reasonable approximation of its pre-mining condition. Rehabilitation activities include landscaping and re-vegetation measures, as well as removal of buildings, fixtures and equipment from sites where exploration, prospecting, mining or quarrying operations have occurred. Removal of overburden is not counted as part of minesite rehabilitation but the management of overburden is included.
Mine de-watering	This item refers to the act of extracting water or groundwater from a minesite and discharging any unused component into a local aquifer.
Mining industry	This industry is as defined as subdivisions 11,12,13 and 14 of the Australian and New Zealand Standard Industrial Classification, 1993.
Non-hazardous solid recyclables	This item refers to those materials which were separated by the business for recycling and collection by another organisation.
Other environment management	This item refers to environment management activities not elsewhere specified and includes activities such as measures to reduce noise and vibration, protection of soil and water from pollution, site rehabilitation and maintaining or protecting natural habitat areas.
Public environmental report	This item refers to a publicly available report on the environmental impacts and activities of a business.
Solid waste management	This item refers to the storage, handling, treatment, transport, re-use, recycling and/or disposal of hazardous and non-hazardous solid wastes. These are wastes which are of no further immediate value for the purpose for which they were used or produced because of the quality, quantity or timing of their occurrence in manufacturing processes. Solid waste includes solid waste recyclables and by-products.
Voluntary EMS or Code of Practice	This item refers to a voluntary comprehensive set of guidelines for managing environmental performance and activities which integrates environmental management into daily operations, long-term planning and other quality management systems.
Water discharged	This item refers to water discharged off-site by mining businesses, including mine dewatering, and all other water discharges.
Water extracted	This item refers to the volume of water extracted by this business e.g. from bores, rivers, reservoirs and dams.

Water supplied	This item refers to the volume of water supplied by other organisations e.g. via mains.
Written environmental policy or plan	This item refers to an internal statement of the business' general environmental aims, impacts and/or activities.

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