
Chapter Twenty-two

Construction and Housing

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THE CONSTRUCTION INDUSTRY

The construction industry engages in three broad areas of activity — residential building (houses, flats, etc.), non-residential building (offices, shops, hotels, etc.), and engineering construction (roads, bridges, water and sewerage, etc.). In this section an overview of the structure, operations and trends is presented of the construction industry as a whole, based on statistical collections undertaken about every five years, 1988-89 being the latest period for which this overall data is available. This is followed by more recent and detailed statistics on residential

building, non-residential building and engineering construction activities obtained from other ongoing statistical collections. Because of the different sources and methods used for the various collections the resulting statistics are not always comparable with each other.

Significance in the economy

The construction industry is an important sector of the Australian economy. Not only is it significant in its own right, but it has an influential effect on other sectors of the economy.

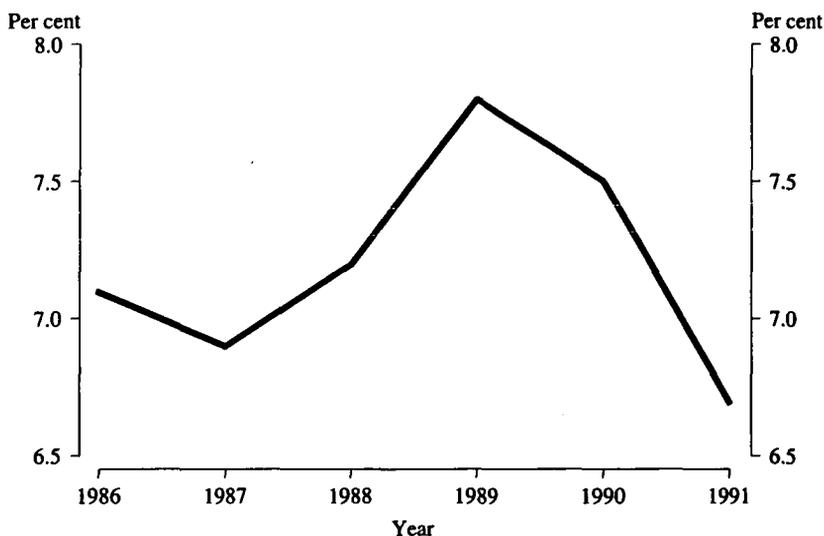
**CONTRIBUTION OF CONSTRUCTION INDUSTRY TO GROSS PRODUCT
AT AVERAGE 1984-85 PRICES
(\$ million)**

Industry	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
Construction	16,164	15,843	16,538	17,948	18,240	16,833
All industries(a)	226,452	229,534	241,621	253,880	264,668	261,701
Per cent contribution	7.1	6.9	6.8	7.1	6.9	6.4

(a) Includes ownership of dwellings, and import duties less imputed bank service charge.

Source: Australian National Accounts: Gross Product, Employment and Hours Worked (5211.0).

**PERCENTAGE OF WORKFORCE EMPLOYED IN CONSTRUCTION INDUSTRY
(August 1986 to August 1991)**



Source: The Labour Force, Australia (6203.0).

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS: SUMMARY OF OPERATIONS BY INDUSTRY CLASS, 1988-89

ASIC code	Description	Employment						Total turnover (\$m)	Wages and salaries (\$m)	Stocks		Total purchases and selected expenses (\$m)	Value added (\$m)
		Establishments operating during the year ('000)	Working proprietors and partners ('000)	Employees ('000)	Total ('000)	Total turnover (\$m)	Wages and salaries (\$m)			Opening (\$m)	Closing (\$m)		
4111	House construction	13.9	13.9	29.4	43.4	8,488.7	566.5	691.4	1,077.1	7,029.8	1,844.6		
4112	Residential building construction n.e.c.	1.8	1.5	6.3	7.8	1,851.0	136.4	206.9	309.5	1,543.9	409.8		
4113	Non-residential building construction	3.9	2.8	44.5	47.3	13,749.2	1,349.2	790.8	1,082.8	11,069.3	2,971.9		
411	Total building construction	19.6	18.2	80.2	98.4	24,088.9	2,052.1	1,689.1	2,469.4	19,643.0	5,226.2		
4121	Road and bridge construction	0.8	0.5	11.5	12.0	2,214.7	324.1	75.6	98.2	1,481.0	756.3		
4122	Non-building construction n.e.c.	3.1	2.9	22.1	25.0	3,076.0	662.5	130.8	116.8	1,868.2	1,193.8		
412	Total non-building construction	3.9	3.4	33.6	37.0	5,290.7	986.6	206.4	215.0	3,349.2	1,950.1		
41	Total general construction	23.5	21.6	113.8	135.4	29,379.6	3,038.7	1,895.5	2,684.4	22,992.2	7,176.3		
4231	Concreting	4.1	4.3	12.1	16.4	1,452.6	275.8	16.5	*23.5	835.2	624.4		
4232	Bricklaying	7.7	10.4	10.3	20.8	763.6	198.1	5.5	7.6	232.4	533.4		
4233	Roof tiling	1.5	1.9	3.2	5.1	343.2	52.6	8.4	8.9	218.2	125.5		
4234	Floor and wall tiling	2.9	3.7	2.2	5.9	240.6	39.6	3.7	5.6	103.8	138.6		
4241	Structural steel erection	1.2	1.1	7.1	8.2	506.8	195.0	11.7	11.8	180.4	326.6		
4242	Plumbing	10.6	11.1	25.1	36.2	2,451.3	522.6	45.4	56.3	1,294.1	1,168.2		
4243	Electrical work	8.5	8.2	30.5	38.7	2,753.9	735.3	86.7	88.9	1,458.3	1,297.8		
4244	Heating and air conditioning	1.3	0.9	12.7	13.5	1,595.9	312.7	72.1	86.1	1,002.2	607.8		
4245	Plastering and plaster fixing	4.5	5.4	10.5	15.9	1,040.2	204.2	14.3	21.3	587.9	459.4		
4246	Carpentry	12.7	16.8	13.6	30.4	1,288.6	280.3	24.9	29.0	539.2	753.5		
4247	Painting	8.9	11.3	13.1	24.4	1,085.4	273.3	14.3	14.8	427.8	658.1		
4248	Earthmoving and dredging	4.5	4.9	12.3	17.2	1,662.8	290.7	42.6	47.7	860.7	807.3		
4249	Special trades n.e.c.	6.3	6.4	20.6	27.0	2,191.3	483.8	50.2	58.2	1,185.6	1,013.7		
42	Total special trade construction	74.5	86.4	173.2	259.6	17,376.3	3,863.8	396.3	459.9	8,925.6	8,514.4		
41,42	Total construction	98.1	108.0	287.0	395.0	46,755.9	6,902.5	2,291.8	3,144.4	31,917.7	15,690.7		

(a) Includes contract construction revenue; sales of speculative construction projects; capital work done for own use, rental or lease; and other operating revenue. (b) Includes purchases of materials and plant fuels; transfers in; payments to contractors and sub-contractors; rent, leasing and hiring expenses; motor vehicle running expenses; outward freight and carriage; and commission expenses.

Source: Construction Industry, Australia: Summary of Private Sector Operations, 1988-89 (8771.0).

At average 1984–85 prices, the construction industry has contributed on average 6.9 per cent of total gross product. This contribution has declined in the last two years and the 1990–91 contribution of 6.4 per cent is the lowest of the last 11 years.

Over the last six years, an average of 7.2 per cent of the workforce has been employed in the construction industry. This proportion peaked at 7.8 per cent in 1988 but has fallen the last two years, reflecting the recent decline in construction activity and depressed economic conditions. In August 1991, there were 510,200 persons employed in the construction industry, down from the peak of just over 600,000 in 1989.

The structure of the Construction Industry

Construction activity is undertaken by both the private and public sector in Australia. Private sector activity is concentrated in the residential and non-residential (offices, hotels, etc.) building sectors, while the public sector plays a key role in initiating and undertaking engineering construction activity.

The ABS conducts construction industry surveys about every five years. For the most recent survey period, 1988–89, two collections were undertaken: the Construction Industry Survey of private sector construction establishments and a

survey of construction activities undertaken by public sector enterprises. Key statistics for the two sectors are presented below. Because of the different concepts used in the collection of these data, the public sector results cannot be validly aggregated with those for the private sector.

Private sector construction

Australia wide, there were 98,100 private sector construction establishments operating at some time during 1988–89 (*see* table on previous page). These establishments employed 395,000 persons, 287,000 (72.7%) as employees and the remaining 108,000 (27.3%) as working proprietors and partners, the latter occurring predominantly among special trade construction establishments. Total turnover was \$46,755.9 million and value added, \$15,690.7 million.

The special trade construction industries, while comprising 76.0 per cent of the number of establishments, contributed 65.7 per cent to employment and 54.3 per cent to value added. Non-residential construction (*i.e.*, the sum of non-residential building construction and non-building construction) on the other hand, while comprising only 8.0 per cent of the number of establishments, contributed 21.3 per cent to employment and 31.4 per cent to value added.

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS: NUMBER OF ON-SITE WORKERS BY OCCUPATION, 30 JUNE 1989

<i>Occupation</i>	<i>Number ('000)</i>	<i>Per cent</i>
Managers, supervisors and technicians	42.7	14.5
Building trades	96.7	32.8
Finishing trades	40.9	13.9
Electrical and electronic trades	32.0	10.9
Metal trades	13.8	4.7
Other trades	4.9	1.7
Plant and machine operators	1322.5	7.6
Labourers	32.2	10.9
Other occupations	9.0	3.1
Total	294.6	100.0

Source: Construction Industry Australia: Summary of Private Sector Operations, 1988–89 (8771.0).

An estimated 294,600 people were employed on-site by private sector construction establishments at 30 June 1989. The largest occupational group was 'building trades' which

accounted for 32.8 per cent of on-site employment. This was followed by managers, supervisors and technicians with 14.5 per cent, finishing trades with

13.9 per cent and labourers, and electrical and electronic trades both with 10.9 per cent.

Public sector construction

The Public Sector Construction Activity Survey provided details on the construction and/or

repair and maintenance activities of all public sector enterprises which had expenditure of \$250,000 or more. This includes hospitals and universities administered by relevant public authorities.

PUBLIC SECTOR ENTERPRISES UNDERTAKING CONSTRUCTION ACTIVITY EXPENDITURE BY LEVEL OF GOVERNMENT, 1988-89 (\$ million)

Level of government	Expenditure on construction, repair and maintenance				
	Work done by own employees			Work done by private sector contractors	Total expenditure
	Wages and salaries	Materials and other expenses	Total		
Commonwealth	1,491.8	1,991.3	3,483.1	1,731.8	5,214.9
State	2,800.6	3,853.9	6,654.5	5,680.6	12,335.1
Local	1,051.5	1,290.4	2,341.9	675.4	3,017.3
Total	5,343.9	7,135.6	12,479.6	8,087.8	20,567.3

Source: Public Sector Construction Activity, Australia, 1988-89 (8775.0).

Australia wide, \$20,567.3 million was spent by the public sector on construction and repair and maintenance activity in 1988-89. Of this, \$8,087.7 million (39.2%) represents payments to private sector contractors, \$7,135.6 million (34.7%) was spent on materials and other expenses, with the remaining \$5,343.9 million

(26.0%) spent on wages and salaries of public sector employees. State Government was responsible for the bulk of the expenditure with \$12,335.1 million (60.0%). The Commonwealth Government outlayed \$5,214.9 million (25.4%) and local government \$3,017.3 million (14.7%).

PUBLIC SECTOR ENTERPRISES UNDERTAKING CONSTRUCTION ACTIVITY EMPLOYMENT BY LEVEL OF GOVERNMENT, JUNE 1989(a)

Level of government	Number of enterprises	Employment		
		On-site ('000)	Off-site ('000)	Total ('000)
Commonwealth	176	41.7	6.8	48.5
State	498	79.3	24.8	104.1
Local	828	43.2	7.8	51.0
Total	1,502	164.2	39.4	203.6

(a) During last pay period in June 1989. Includes apprentices.

Source: Public Sector Construction Activity, Australia, 1988-89 (8775.0).

Overall, 1,502 Commonwealth, State and local government enterprises, employing 203,600 people in construction related occupations, were involved in significant construction and/or repair and maintenance activity during 1988-89. Of the 203,600 public sector personnel involved in construction activity, 51.1 per cent were employed by State

Government, 25.1 per cent by local government and 23.8 per cent by the Commonwealth Government. A total of 164,200 employees (80.7%) were engaged in on-site construction activities, and 39,400 employees (19.3%) worked off-site. This gave a ratio of one off-site support employee for every four employees working on-site.

**PUBLIC SECTOR ENTERPRISES UNDERTAKING CONSTRUCTION ACTIVITY
TOTAL EXPENDITURE BY TYPE OF WORK, 1988-89**

	Commonwealth Government		State Government		Local Government		Total	
	\$m	%	\$m	%	\$m	%	\$m	%
New work, alterations, additions, improvements and renovations								
Building								
Residential	73.7	1.4	768.5	6.2	11.0	0.4	853.1	4.1
Non-residential	1,319.7	25.3	2,843.6	23.1	232.8	7.7	4,396.1	21.4
Total building	1,393.4	26.7	3,612.1	29.3	243.8	8.1	5,249.2	25.5
Engineering								
Roads, highways and subdivisions	95.5	1.8	1,298.6	10.5	834.3	27.7	2,228.4	10.8
Electricity generation, transmission and distribution	40.4	0.8	1,314.2	10.7	228.5	7.6	1,583.0	7.7
Telecommunications	1,899.7	36.4	25.5	0.2	0.2	—	1,925.4	9.4
Other engineering	130.5	2.5	1,741.1	14.1	443.8	14.7	2,315.5	11.3
Total engineering	2,166.1	41.5	4,379.4	35.5	1,506.8	49.9	8,052.3	39.2
Total new work, alterations, additions, improvements and renovations	3,559.4	68.3	7,991.4	64.8	1,750.6	58.0	13,301.5	64.7
Repair and maintenance								
Building	552.3	10.6	1,089.5	8.8	114.8	3.8	1,756.6	8.5
Roads, highways and subdivisions	33.5	0.7	621.9	5.0	780.0	25.9	1,435.4	7.0
Other repair and maintenance	1,069.5	20.5	2,627.8	21.3	371.4	12.3	4,068.7	19.8
Total repair and maintenance	1,655.4	31.7	4,339.2	35.2	1,266.2	42.0	7,260.7	35.3
Total Demolition	0.1	—	4.4	—	0.6	—	5.1	—
Total construction, repair, maintenance and demolition	5,214.9	100.0	12,335.1	100.0	3,017.3	100.0	20,567.3	100.0

Source: Public Sector Construction Activity, Australia, 1988-89 (8775.0).

The largest construction expenditure component across all governments was \$3,663.8 million (17.8%) spent on roads, highways and subdivisions. Of this, \$2,228.4 million (60.8%) was spent on construction of new roads and the remaining \$1,435.4 million (39.2%) on the repair and maintenance of existing roads.

State Governments' largest construction outlay of \$2,627.8 million (21.3%) was on the repair and maintenance of non-road engineering structures. Electricity generation, transmission and distribution was next with \$1,314.2 million (10.7%) and construction of roads, highways and subdivisions accounted for \$1,298.6 million (10.5%). An additional \$621.9 million (5.0%) was spent on the repair and maintenance of existing roads, highways and land subdivisions. In contrast, the

Commonwealth Government's largest construction outlay was \$1,899.7 million (36.4%) on telecommunications. The repair and maintenance of non-road engineering structures accounted for \$1,069.5 million (20.5%). Expenditure on buildings (new and alterations and additions) was \$1,393.4 million (26.7%) with expenditure of \$552.3 million (10.6%) on the repair and maintenance of existing buildings.

Local governments' principal construction expenditure was on roads, highways and subdivisions with \$834.3 million (27.7% of total expenditure) spent on new work and \$780.0 million (25.9%) spent on their repair and maintenance. Other major expenditure was \$371.4 million (12.3%) on the repair and maintenance of non-road engineering structures.

**PUBLIC SECTOR ENTERPRISES UNDERTAKING CONSTRUCTION ACTIVITY
NUMBER OF ON-SITE EMPLOYEES BY OCCUPATION, JUNE 1989(a)**

<i>Occupation</i>	<i>Number (^{'000})</i>	<i>Per cent</i>
Managers, supervisors and technicians	20.4	12.4
Building trades	12.8	7.8
Finishing trades	3.7	2.3
Electrical and electronic trades	47.5	28.9
Metal trades	3.0	1.8
Other trades	6.7	4.1
Plant and machine operators	28.2	17.2
Labourers	41.3	25.2
Other occupations	0.7	0.4
Total	164.2	100.0

(a) During the last pay period in June 1989. Includes apprentices.

Source: *Public Sector Construction Activity, Australia, 1988-89 (8775.0)*.

The largest occupational category was electrical and electronic trades with 47,500 employees (28.9%). This was followed by labourers with 41,300 (25.2%), plant and machine operators with 28,200 (17.2%) and

managers, supervisors and technicians with 20,400 (12.4%).

Trends in the Construction Industry

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS: SELECTED ITEMS AND OPERATING RATIOS AT AVERAGE 1984-85 PRICES BY INDUSTRY, 1988-89 AND 1984-85

	General construction industry									
	Building construction industry				Non-building construction industry			Special trade construction industry	Total construction industry	
	House	Residential building n.e.c.	Non-residential building	Total	Road and bridge	Non-building n.e.c.	Total			
ITEMS										
Establishments operating										
At 30 June 1989 (Number)	13,791	1,770	3,861	19,422	777	3,105	3,882	23,304	73,301	96,605
At 30 June 1985 (Number)	19,438	1,536	2,987	23,961	844	2,519	3,362	27,323	73,467	100,789
Movement (%)	-29.1	15.2	29.3	-18.9	-7.9	23.3	15.5	-14.7	-0.2	-4.2
Employment										
At 30 June 1989 ('000)	43.3	7.8	47.3	98.4	12.0	25.0	37.0	135.4	259.6	395.0
At 30 June 1985 ('000)	47.5	4.9	31.9	84.4	12.1	22.8	34.9	119.3	206.9	326.2
Movement (%)	-8.8	59.2	48.3	16.6	-0.8	9.6	6.0	13.5	25.5	21.1
Turnover										
1988-89 (\$ million)	5,907.3	1,323.1	10,043.2	17,273.6	1,809.4	2,219.4	4,028.8	21,302.4	12,600.7	33,903.1
1984-85 (\$ million)	5,107.0	830.3	5,717.0	11,654.3	1,655.5	2,498.6	4,154.2	15,808.5	9,140.0	24,948.5
Movement (%)	15.7	59.4	75.7	48.2	9.3	-11.2	-3.0	34.8	37.9	35.9

... continued

PRIVATE SECTOR CONSTRUCTION ESTABLISHMENTS: SELECTED ITEMS AND OPERATING RATIOS AT AVERAGE 1984-85 PRICES BY INDUSTRY, 1988-89 AND 1984-85 — *continued*

	General construction industry									
	Building construction industry					Non-building construction industry				
	House	Residential building n.e.c.	Non-residential building	Total	Road and bridge	Non-building n.e.c.	Total	Special trade construction	Total industry	Total construction industry
OPERATING RATIOS										
Employment per establishment										
At 30 June 1989 (Number)	3.1	4.4	12.3	5.1	15.4	8.1	9.5	5.8	3.5	4.1
At 30 June 1985 (Number)	2.4	3.2	10.7	3.5	14.3	9.1	10.4	4.4	2.8	3.2
Movement (%)	28.5	38.1	14.7	43.8	7.7	-11.0	-8.2	33.1	25.8	26.3
Turnover per establishment										
1988-89 (\$'000)	428.3	747.5	2,601.2	889.4	2,328.7	714.8	1,037.8	914.1	171.9	350.9
1984-85 (\$'000)	262.7	540.4	1,914.0	486.4	1,961.5	991.9	1,235.6	578.6	124.4	247.5
Movement (%)	63.0	38.3	35.9	82.9	18.7	-27.9	-16.0	58.0	38.2	41.8
Turnover to employment										
1988-89 (\$'000)	136.4	169.6	212.3	175.5	150.8	88.8	108.9	157.3	48.5	85.8
1984-85 (\$'000)	107.5	169.4	179.2	138.1	136.8	109.6	119.0	132.5	44.2	76.5
Movement (%)	26.9	0.1	18.5	27.1	10.2	-19.0	-8.5	18.7	9.9	12.2

Source: *Construction Industry Australia: Summary of Private Sector Operations, 1988-89 (8771.0)*.

The above table sets out some selected items and operating ratios at average 1984-85 prices, by industry for 1988-89 and 1984-85. These statistics may assist in gauging the performance of the private sector construction industry.

The number of establishments fell 4.2 per cent from 100,800 in 1984-85 to 96,600 in 1988-89. However, employment increased by 21.1 per cent from 326,000 to 395,000 in the same period. This indicates a rationalisation within the construction industry with fewer but larger establishments. The employment per establishment ratio of 3.2 in 1984-85 rose 26.3 per cent to 4.1 in 1988-89.

Turnover at average 1984-85 prices rose significantly from \$24,948.5 million in 1984-85 to \$33,903.1 million in 1988-89, a 35.9 per cent increase. This increase was most pronounced in the non-residential building construction (up 75.7%) and the residential building construction n.e.c. (up 59.4%) industries. Turnover in the non-building construction n.e.c. industry fell 11.2 per cent from \$2,498.6 million in 1984-85 to \$2,219.4 million in 1988-89.

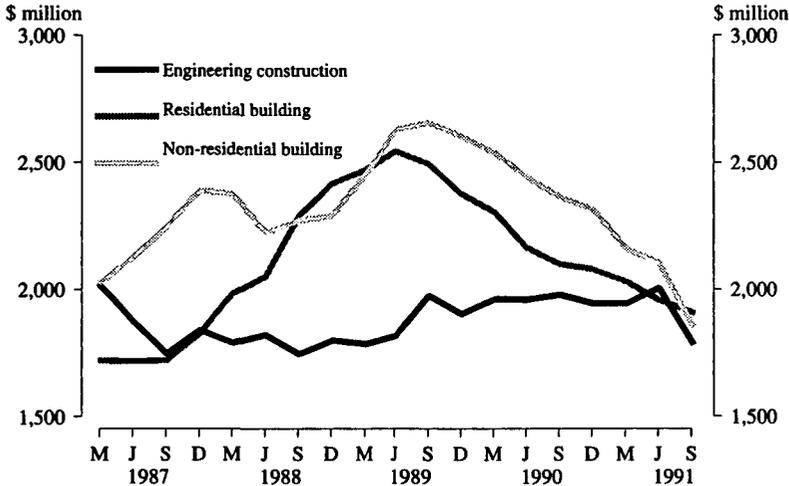
Trends over recent years in the level of activity of the construction industry as a whole, both private and public, are shown below.

PRIVATE AND PUBLIC CONSTRUCTION ACTIVITY AT AVERAGE 1984-85 PRICES
(\$ million)

<i>Year/quarter</i>	<i>Residential building</i>	<i>Non-residential building</i>	<i>Engineering construction</i>	<i>Total construction</i>
1989				
December	2,487	2,738	1,955	7,180
1990				
March	2,137	2,317	1,811	6,265
June	2,150	2,423	2,072	6,644
September	2,151	2,451	1,960	6,562
December	2,179	2,440	1,995	6,613
1991				
March	1,882	1,960	1,803	5,645
June	1,946	2,063	2,105	6,114
September	1,950	1,879	1,761	5,589

Source: *Construction Activity at Constant Prices, Australia (8782.0)*.

PRIVATE AND PUBLIC CONSTRUCTION ACTIVITY AT AVERAGE 1984-85 PRICES, SEASONALLY ADJUSTED



Source: *Construction Activity at Constant Prices, Australia (8782.0)*.

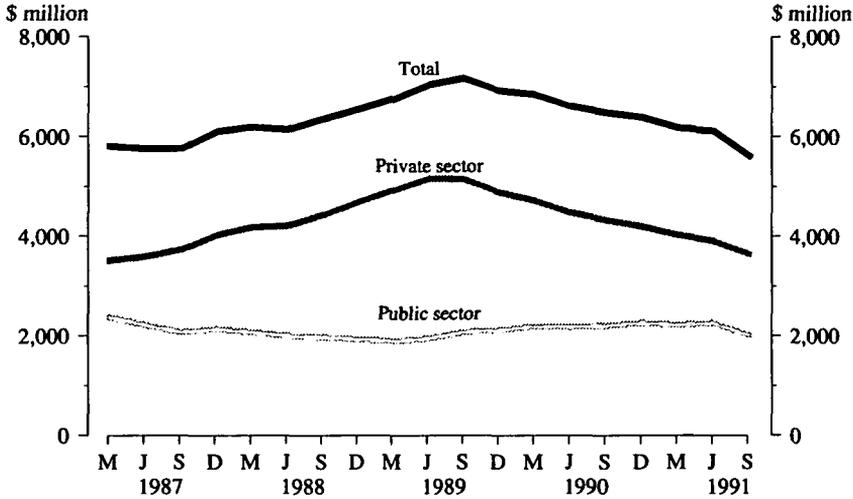
The decline in total construction activity over the last two to three years can be clearly seen. Both residential building and non-residential building have declined significantly since 1988-89, while engineering construction activity has held up against these trends.

In the September quarter 1991 total construction activity at average 1984-85 prices was \$5,589 million. Of this, \$3,652 million (65.3%) was work done for the private sector, with the remaining \$1,936 million (34.6%) being work done for the public sector. Of the work done for the private sector,

\$1,867 million (51.1%) was on residential building, \$1,227 million (33.6%) on non-residential building and the residual \$558 million (15.3%) on engineering construction.

Expenditure for the public sector differed considerably, with \$1,203 million of the \$1,936 million expenditure (62.1%) being spent on engineering construction. Expenditure on residential building (\$83 million) made up only 4.3 per cent of total expenditure, with the remaining \$651 million (33.6%) spent on the construction of non-residential building.

**PRIVATE AND PUBLIC CONSTRUCTION ACTIVITY AT AVERAGE 1984-85 PRICES
SEASONALLY ADJUSTED**



Source: *Construction Activity at Constant Prices, Australia (8782.0)*.

Construction activity for the public sector has remained relatively constant at just over \$2,000 million each quarter. The volatility in the total construction series is dominated by the trends in the private sector construction activity series.

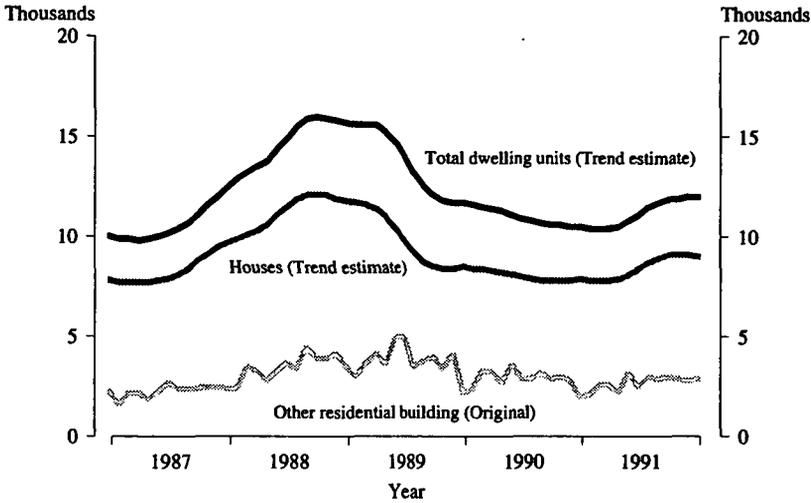
Up to this point, this chapter has provided an overview of the construction industry as a whole. As stated at the beginning of the chapter, the industry has three broad areas of activity — residential building, non-residential

building and engineering construction. These sectors are examined in more detail in the following sections.

Residential building

Residential building involves the construction of dwelling units. In this section, dwelling units are separated into new houses and other residential building (flats, apartments, villa units, town houses, and other dwelling units).

NUMBER OF DWELLING UNITS APPROVED IN NEW RESIDENTIAL BUILDINGS



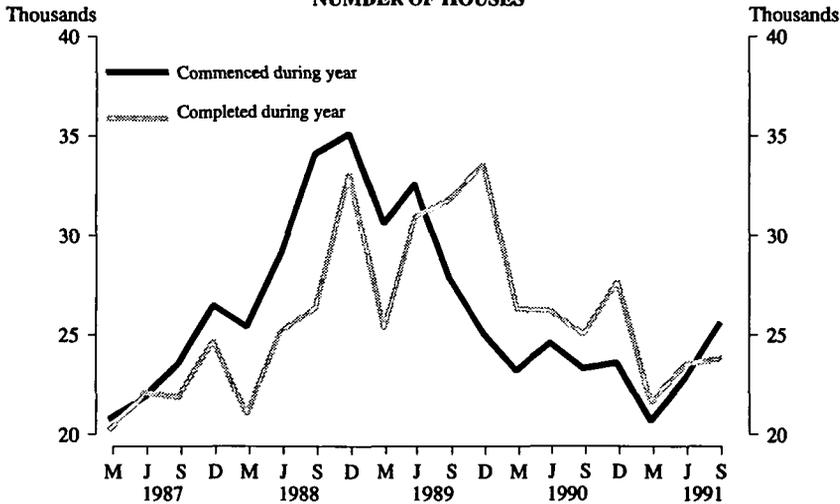
Source: Building Approvals, Australia (8731.0).

As can be seen in the above chart, other residential building approvals are substantially lower than house approvals. House building approvals rose from June quarter 1987, peaked

in September quarter 1988 and have since fallen away.

New houses

**NEW HOUSE BUILDING ACTIVITY
NUMBER OF HOUSES**



Source: Building Activity, Australia (8752.0).

The preceding chart reflects that the number of new house commencements follows a cyclical pattern which lasts for approximately four years. Lows were recorded in 1982-83, 1986-87 and 1990-91 with 79,100 houses commenced in 1982-83 being the lowest

figure over the last 12 years. Peaks occurred in 1984-85 and 1988-89, the 1988-89 figure (132,400) being the largest over a 12 year period. Since 1988-89 commencements dropped sharply. Completions generally follow the pattern of commencements.

RESIDENTIAL BUILDING, 1990-91
(*000)

	<i>New houses</i>	<i>New other residential building</i>
Private Sector		
Approved	91.0	26.3
Commenced	87.0	24.4
Completed	94.0	28.9
Public Sector		
Approved	3.1	5.7
Commenced	3.4	6.4
Completed	3.8	7.7
Total		
Approved	94.1	32.0
Commenced	90.5	30.9
Completed	97.8	36.7

Source: Building Approvals, Australia (8731.0) and Building Activity, Australia (8752.0).

The total number of new houses approved in Australia in 1990-91 was 94,100, a decrease of 6,700 on the 1989-90 figure of 100,800. Private sector approvals contributed 96.7 per cent to the total number of new houses approved. New house completions in Australia during 1990-91 totalled 97,600.

Approvals were down on 1989-90 figures in all States except Queensland and South Australia. The largest fall was in Victoria, where approvals declined from 27,600 in 1989-90 to 20,900 in 1990-91. This follows the downward trend of approvals in new houses since 1988.

Other residential building

The level of activity of other residential building construction is highly variable and does not follow the regular pattern experienced in house construction. This can be explained partly by the generally larger size of other residential building construction jobs and also by the extent of speculative building of private

flats, home units and similar other residential building projects.

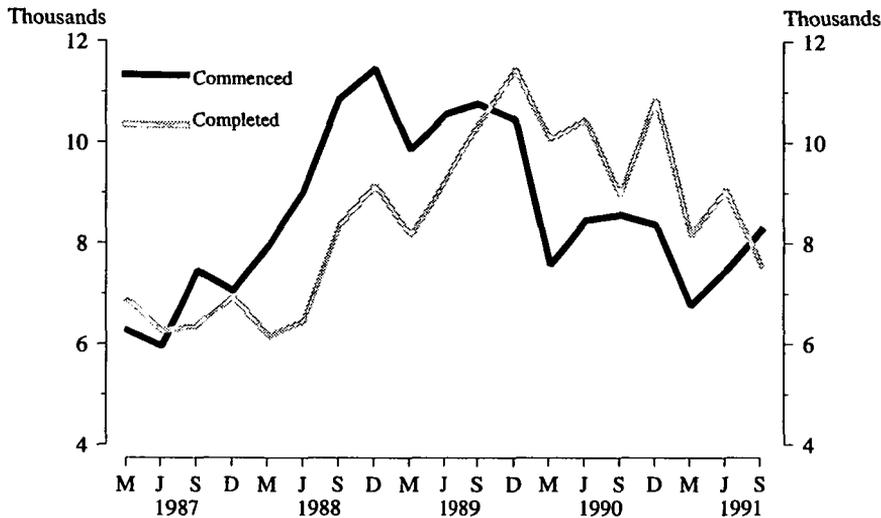
Of the 32,000 new other residential building dwelling units which were approved in Australia during 1990-91, 82.2 per cent were private sector jobs. The public sector plays a much larger role in the construction of other residential building dwelling units than it does in the construction of houses.

The number of approvals decreased from the 1989-90 figures in all States and Territories. The total number of dwelling units in new other residential building approved declined by 7,200. The largest fall was in Queensland with 2,100 less approvals than in 1990-91.

The number of new other residential buildings completed in 1990-91 was 36,700, a 5,400 decrease on the 1989-90 figure of 42,100.

Commencements recorded peaks in 1988-89 and have since fallen away. Completions peaked in 1989-90 and have fallen since.

**OTHER RESIDENTIAL BUILDING ACTIVITY
NUMBER OF DWELLING UNITS**



Source: *Building Activity, Australia (8752.0)*.

Value of residential building

Approvals for total new residential building were valued at \$10,253.3 million in 1990-91. New house approvals were valued at \$7,998.8 million, or 78.0 per cent of the total value of new residential building approvals. Approvals

for alterations and additions totalled \$1,894.9 million.

The value of work done on new residential buildings in 1990-91 was \$11,154.2 million, making up 41.4 per cent of the total value of building work done, and the value of alterations and additions was \$2,129.7 million.

**VALUE OF RESIDENTIAL BUILDING, 1990-91
(\$ million)**

<i>Class of building</i>	<i>Approved</i>	<i>Work done(a)</i>
New residential buildings		
New houses	7,998.8	8,550.6
New other residential buildings	2,254.5	2,620.0
Total new residential building	10,253.3	11,170.6
Alterations and additions to residential buildings(b)	1,894.9	2,131.3

(a) During period. (b) Valued at \$10,000 or more.

Source: *Building Approvals, Australia (8731.0)* and *Building Activity, Australia (8752.0)*.

Non-residential building

Value of non-residential building

The value of total non-residential building approved in Australia during 1990-91 was \$8,957.4 million, a 32.1 per cent decrease on the 1989-90 figure of \$13,199.7 million. Falls were recorded in all categories with the exception of Religious which posted a slight increase of \$2.5 million. The largest drop (in both absolute and relative terms) was in the approvals of Offices which plummeted from \$4,253.3 million in 1989-90 to \$2,383.3 million in 1990-91, a drop of 56.0 per cent.

The total value of work done on non-residential building in 1990-91 was

\$13,664.8 million, a decrease of 12.0 per cent on the 1989-90 figure of \$15,535.3 million.

All categories of non-residential building recorded decreases in the value of work done in 1990-91, except Educational which increased by 11.9 per cent.

The value of work done on Offices in 1990-91 was \$4,708.6 million or 34.5 per cent of total non-residential building. Other significant categories were Other business premises and Shops which contributed about 11.6 per cent each to total non-residential building.

VALUE OF NON-RESIDENTIAL BUILDING, 1989-90 AND 1990-91
(\$ million)

Class of building	1989-90		1990-91	
	Approved	Work done(a)	Approved	Work done(a)
Hotels, etc.	929.6	1,326.1	526.0	1,193.8
Shops	1,917.6	2,052.4	1,256.2	1,584.2
Factories	1,475.8	1,640.1	1,111.7	1,312.6
Offices	4,253.3	5,504.4	2,383.3	4,730.6
Other business premises	1,634.7	1,736.4	1,054.3	1,608.9
Educational	1,070.0	1,088.8	928.1	1,225.6
Religious	73.6	86.8	76.1	81.2
Health	607.2	720.7	526.2	676.0
Entertainment and recreational	545.5	706.2	536.0	649.9
Miscellaneous	692.4	673.3	559.4	665.0
Total non-residential building(b)	13,199.7	15,535.3	8,957.4	13,727.8

(a) During period. (b) Valued at \$30,000 or more.

Source: *Building Approvals, Australia (8731.0)* and *Building Activity, Australia (8752.0)*.

Building activity at constant prices

Estimates of the value of work done at average 1984-85 prices are presented below.

Constant price estimates measure changes in value after the direct effects of price changes have been eliminated.

VALUE OF BUILDING WORK DONE AT AVERAGE 1984-85 PRICES
(\$ million)

Year	New residential building			Alterations and additions to residential buildings	Non-residential building	Total building
	Houses	Other residential buildings	Total			
1985-86	5,552.9	1,307.0	6,859.9	953.4	7,425.5	15,238.8
1986-87	4,808.2	1,116.2	5,924.4	951.9	8,045.3	14,921.6
1987-88	5,314.9	1,170.2	6,485.1	1,071.2	9,223.6	16,779.9
1988-89	6,696.9	1,784.2	8,481.1	1,228.2	9,620.1	19,329.4
1989-90	6,038.4	1,983.7	8,022.1	1,314.2	10,239.3	19,575.6
1990-91	5,197.0	1,689.5	6,886.5	1,272.4	8,947.9	17,106.8

Source: *Building Activity, Australia (8752.0)*.

At average 1984–85 prices, the value of total building work dropped significantly in 1990–91. Following a slight increase in 1989–90, the value of building work done at average 1984–85 prices fell by \$2,552.3 million (or 13%) to \$17,023.3 million.

All categories of building work suffered downturns with new residential building recording the largest drop of 14.3 per cent. Alterations and additions to residential

buildings held up a little better, recording a drop of only \$42.7 million (3.2%).

Engineering construction

This section contains estimates of engineering construction activity in Australia by both public and private sector organisations. These estimates together with data on residential and non-residential building provide a complete picture of construction activity in Australia.

VALUE OF ENGINEERING CONSTRUCTION WORK DONE, 1990–91
(\$ million)

	<i>For the private sector</i>	<i>For the public sector</i>	<i>Total</i>
Roads, highways and subdivisions	1,022.8	2,381.6	3,404.4
Bridges	11.0	229.0	240.0
Railways	17.7	406.8	424.4
Harbours	49.0	101.2	150.2
Water storage and supply	100.2	667.7	767.9
Sewerage and drainage	93.8	583.2	677.0
Electricity generation transmission and distribution	94.2	1,458.7	1,552.9
Pipelines	68.3	104.6	172.9
Recreation	321.3	160.8	482.1
Telecommunications	8.8	2,302.8	2,311.6
Heavy industry	1,329.1	126.1	1,455.2
Other	24.4	31.5	55.9
Total	3,140.5	8,554.0	11,694.5

Source: *Engineering Construction Activity, Australia* (8762.0).

The total value of engineering construction work done during 1990–91 was \$11,694.5 million compared with \$10,983.7 million during 1989–90. 73.1 per cent was for the public sector, and the remaining 26.9 per cent for the private sector.

Overall, significant expenditure was made in the categories of roads, highways and subdivisions (29.1% of total expenditure), telecommunications (19.8%), electricity generation transmission and distribution (13.3%), and heavy industry (12.4%).

For the private sector, the total value of engineering construction work done during 1990–91 was \$3,140.5 million. Construction activity centred around the categories of heavy industry (42.3%), roads, highways and subdivisions (32.6%) and recreation (10.2%).

For the public sector the value of engineering construction work done was \$8,554.0 million. Major construction activity was undertaken in the categories of roads, highways and

subdivisions (27.8%), telecommunications (26.9%) and electricity generation transmission and distribution (17.0%).

HOUSING

Since Federation, Australian Governments, through their policies, have encouraged home ownership. A high level of home ownership is seen as promoting a stable, healthy and productive society. In addition, a strong housing construction industry provides substantial employment both within the industry and in associated sectors of the economy, such as banking, real estate and manufacturing.

In recent times, adequate, affordable housing has been identified as a government priority with the establishment of a National Housing Strategy in June, 1990.

This part of the chapter provides a profile of the various aspects of housing in Australia, based on information from the five-yearly Census of Population and Housing and from periodic surveys. Care should be taken when comparing statistics from different sources because of differences in the timing of individual statistical collections and in the conceptual bases for respective topics.

Number and types of dwellings

Number of dwellings

The number of dwellings is distributed broadly according to the population of each State and

Territory. However the growth in the number of dwellings between 1981 and 1986 was variable. The Northern Territory had the highest growth with 35 per cent followed by Queensland with nearly a 20 per cent increase over the five year period. Of the rest, Western Australia and the Australian Capital Territory had an above average growth, while New South Wales and Victoria had, at less than nine per cent, the lowest growth, compared with the average for Australia of 11 per cent over the five year period.

NUMBER OF DWELLINGS BY STATE

State/Territory	30 June 1981		30 June 1986		
	Occupied(a)	Unoccupied	Occupied(a)(b)	Caravans, etc.(c)	Unoccupied
New South Wales	1,669,594	153,251	1,817,392	21,916	174,467
Victoria	1,243,451	124,522	1,351,118	9,475	143,264
Queensland	703,964	83,366	838,122	27,310	94,714
South Australia	433,841	42,407	474,456	3,162	48,546
Western Australia	405,997	42,100	458,762	10,749	53,851
Tasmania	136,269	17,765	149,484	658	19,470
Northern Territory	29,563	2,368	39,779	3,456	3,639
Australian Capital Territory	68,740	3,963	79,363	368	5,588
Australia	4,691,419	469,742	5,208,476	77,094	543,539

(a) Includes non-private dwellings. (b) Excludes caravans, etc., in caravan parks. (c) Includes occupied caravans, tents, cabins, etc., in caravan parks, and occupied boats in marinas.

Source: Unpublished ABS Population Census statistics.

Type of dwellings

The types of dwelling in Australia are dominated by the standard suburban cottage, here described as a 'separate house', which represents over 80 per cent of all homes. Of the other categories of dwellings the majority are either medium density dwellings (7%) or low-rise flats (8%).

There is a relatively high proportion of semi-detached houses in South Australia and

Western Australia, (eight and six per cent respectively), compared with the average for Australia of three per cent. Australia has just under 10 per cent of its dwellings in the form of flats or units (low and high-rise). However, in the Northern Territory and New South Wales this proportion is greater than 15 per cent, while in Western Australia flats/units account for just under three per cent of dwellings.

TYPES OF DWELLING, FEBRUARY-MAY 1988
(*000)

<i>State/Territory</i>	<i>Separate house</i>	<i>Semi-detached house</i>	<i>Medium density</i>	<i>Low-rise flat/unit</i>	<i>High-rise flat</i>	<i>Total</i>
New South Wales	1,490.8	43.4	109.1	237.9	39.7	1,920.9
Victoria	1,174.4	37.0	125.2	93.9	5.2	1,435.7
Queensland	771.9	16.8	53.0	50.4	5.3	897.4
South Australia	392.2	41.3	47.2	19.1	1.5	501.3
Western Australia	422.2	31.8	29.8	18.8	7.3	509.9
Tasmania	136.5	3.4	10.4	5.2	.	155.5
Northern Territory	32.3	0.6	6.6	5.8	1.5	46.8
Australian Capital Territory	70.5	2.0	8.7	6.2	0.9	88.3
Australia	4,490.8	176.5	389.8	437.3	61.4	5,555.8

Source: Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 (4133.0).

Standard of housing and facilities

The following information on certain physical features and facilities of dwellings provides some indication of the standard of housing conditions in Australia.

Material of outer walls

The use of certain materials for outer walls is dictated by such factors as availability, cost, durability, appearance and climatic conditions. Changes in the materials used over time indicate changes in the characteristics of the housing stock.

The majority of new houses approved in Australia in 1990-91 were brick veneer

(62.1%). The next most popular material was double brick with 16.6 per cent of the total, followed by timber (6.8%) and fibre cement (4.9%).

The pattern across the States and Territories shows brick veneer dominating in every case except in Western Australia and Northern Territory where double brick is most used. In Western Australia 85.4 per cent of new houses approved are double brick; in the Northern Territory the figure is 50.3 per cent. The largest percentage of approvals for timber construction was in Tasmania (18.3% of Tasmanian approvals).

**NUMBER OF NEW HOUSES APPROVED BY MATERIAL OF OUTER WALLS
AS A PROPORTION OF TOTAL STATE, 1990-91
(per cent)**

<i>Material of outer wall</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>ACT</i>	<i>Aust.</i>
Double brick(a)	14.1	1.1	5.8	5.7	85.4	6.9	50.3	1.8	16.6
Brick veneer	71.5	60.5	75.5	73.8	4.2	68.8	1.7	91.9	62.1
Timber	7.0	6.8	9.4	0.9	3.7	18.3	2.2	0.4	6.8
Fibre cement	5.9	1.7	7.3	5.5	4.5	3.0	1.4	0.1	4.9
Other	1.4	1.3	2.0	0.4	2.2	3.0	44.4	2.1	1.9
Not stated	0.1	28.7	—	13.7	—	—	—	3.7	7.7

(a) Includes houses constructed with outer walls of stone and concrete.

Source: Building Approvals Microfiche Service, Australia (8734.0).

Number of bedrooms

The most readily available indicator of dwelling size is the number of bedrooms. The table below shows the overwhelming dominance of three bedroom houses. Two-thirds of all separate houses, and half of

all dwellings, have three bedrooms. Two bedroom dwellings predominate for all categories other than separate houses, accounting for between a half to two-thirds of semi-detached homes, medium density flats, low-rise and high-rise units.

**NUMBER OF DWELLINGS BY TYPE OF DWELLING AND NUMBER OF BEDROOMS
FEBRUARY-MAY 1988
(*000)**

<i>Number of bedrooms</i>	<i>Separate house</i>	<i>Semi-detached house</i>	<i>Medium density</i>	<i>Low-rise flat/unit</i>	<i>High-rise flat</i>	<i>Total</i>
One	69.1	17.7	85.0	120.7	22.5	314.9
Two	711.7	84.0	239.0	288.6	31.8	1,355.0
Three	2,739.4	68.5	60.2	27.0	7.1	2,902.2
Four	831.7	5.5	5.7	1.1	..	844.0
Five or more	138.9	0.7	..	..	..	139.7
Total	4,490.8	176.5	389.8	437.3	61.4	5,555.8

Source: Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 (4133.0).

Undercover parking

Parking is a valued facility in most urban areas, particularly in the inner suburbs of cities.

Over one-fifth of all dwellings have no undercover parking. Almost half of high-rise flats and semi-detached dwellings, which tend to be concentrated in inner urban areas, have no undercover parking.

Approximately half of separate houses have garages and a quarter have carports, 10 per cent have both and 20 per cent have neither. Dwellings other than separate houses which have undercover parking, tend to have a higher proportion of carports to garages.

**NUMBER OF DWELLINGS BY TYPE OF DWELLING AND TYPE OF UNDERCOVER
PARKING AVAILABLE, FEBRUARY-MAY 1988
(*000)**

<i>Undercover parking</i>	<i>Separate house</i>	<i>Semi-detached house</i>	<i>Medium density</i>	<i>Low-rise flat/unit</i>	<i>High-rise flat</i>	<i>Total</i>
None	815.7	83.3	118.4	170.3	27.5	1,215.1
Carport only	1,068.9	48.4	142.4	128.3	16.0	1,403.9
Garage only	2,181.5	41.1	122.7	137.0	16.3	2,498.6
Both	424.7	3.7	6.4	1.7	1.5	438.1
Total dwellings	4,490.8	176.5	389.8	437.3	61.4	5,555.8

Source: Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 (4133.0).

Household energy usage

In 1985-86 almost five million households used electricity. Over two million households

used gas, either mains or bottled, while just over one million used wood, coal or briquettes.

**NUMBER OF DWELLINGS AND AVERAGE ANNUAL ENERGY CONSUMPTION
BY TYPE OF ENERGY USED, 1985-86**

<i>Type of energy used</i>	<i>Number of dwellings ('000)</i>	<i>Megajoules (MJ)</i>
Electricity	4,907.6	36.3
Reticulated (mains) gas	1,754.5	54.4
Bottled gas	418.7	22.3
Wood/solid fuel	1,068.6	33.0
Oil	395.6	31.4
Kerosene	323.0	25.4
Solar energy	296.9	27.7
Other fuels	21.0	27.2

Source: National Energy Survey: Annual Consumption of Reticulated Energy by Households, Australia (8213.0).

Many households use a combination of energy sources. The table below shows the number of dwellings using the most significant combinations and the average annual household consumption of energy. These statistics reinforce the dominance of electricity as the major source of energy. One-third of all dwellings have electricity as their only source of energy, while most of the other two-thirds have it in combination with other sources of energy.

The average annual consumption of energy varies. For energy combinations involving electricity and gas the average annual consumption was at least 55 megajoules. However, for households with electricity in combinations that exclude gas, the average annual consumption was less than 32 megajoules.

**NUMBER OF DWELLINGS AND AVERAGE ANNUAL ENERGY CONSUMPTION
BY TYPE OF ENERGY USED, 1985-86**

<i>Main energy combinations</i>	<i>Number of dwellings ('000)</i>	<i>Megajoules (MJ)</i>
Electricity only	1,525.7	26.1
Electricity and gas only	1,370.8	55.7
Electricity and wood only	534.2	28.6
Electricity and oil only	227.3	31.2
Electricity and solar energy only	88.3	26.2
Electricity, gas and wood only	201.2	59.5
All other combinations	960.2	..

Source: National Energy Survey: Annual Consumption of Reticulated Energy by Households, Australia (8213.0).

Household appliances and facilities

The table below shows the proportion of dwellings which had selected household appliances or facilities for each of the periods November 1980, June 1983 and the financial year 1985-86.

Nearly all households had a refrigerator, an oven, hotplates or burners and a hot water system, while over 90 per cent had a washing machine.

While the proportion of households with a freezer or clothes dryer had increased since 1980, by 1985-86 they were only found in half of Australia's homes. Also, while the proportions of homes in 1985-86 which had a microwave oven (30%) or a dishwasher (nearly 20%) are quite low, compared with other appliances the increase since 1980 was quite high, particularly for microwaves. Further increases are likely to have occurred since 1985-86.

Electricity provides the most common form of heating with more than 40 per cent of homes having electric heating in 1985-86, a slight decrease from nearly 45 per cent in June 1983. The proportion of homes with air

conditioning increased from just over 27 per cent in November 1980 to more than 35 per cent in 1985-86. Half of all dwellings had some kind of roof insulation, but only 11 per cent of homes had a swimming pool.

DWELLINGS WITH HOUSEHOLD APPLIANCES OR FACILITIES
(per cent)

<i>Appliance/facility</i>	<i>November 1980</i>	<i>June 1983</i>	<i>1985-86</i>
Refrigerators	99.5	99.6	99.6
Freezer	43.0	46.0	46.4
Oven	..	99.0	98.7
Hot plates/burners	..	97.7	98.2
Microwave oven	3.5	10.0	29.9
Electric frypan/skillet	40.2	38.0	69.8
Vertical grill	8.9	6.9	15.4
Dishwasher	13.5	17.1	19.7
Washing machine	91.2	91.8	92.9
Clothes dryer	38.5	45.2	48.1
Hot water system	97.8	98.7	98.9
Heater (of house)			
Electric	..	44.2	41.7
Gas	..	21.9	24.4
Oil	..	7.6	5.6
Wood/solid fuel	..	12.4	15.8
Air-conditioning	27.2	32.3	35.3
Insulation(a)			
Walls	10.6	12.1	15.0
Roof	41.9	43.7	49.8
Swimming pool	8.2	10.1	11.5

(a) Excludes high and low-rise flats or units, mobile or improvised dwellings, and dwellings for which the occupants did not know the type of insulation.

Source: *National Energy Survey: Household Appliances, Facilities and Insulation, Australia (8212.0)*.

HOME OWNERSHIP AND RENTING

The statistics in the table below show the most common type of tenancy is outright ownership of a separate house. People who either own or are purchasing their own home account for 72 per cent of all households, with 81 per cent of all separate houses being occupied in this manner. For other dwelling types those households that rent their dwelling outnumber those who have equity in their dwelling (i.e., owners and purchasers) — twice as many in the case of low-rise flats or units,

and one and a half times as many in the case of semi-detached houses.

Among renters, those going through a private landlord form the largest proportion regardless of the type of dwelling. In particular, tenants renting through private landlords in low-rise flats or units accounted for more than 80 per cent of all rental tenants in that type of dwelling. However, government rental tenants formed almost as high a proportion as those renting through private landlords in semi-detached houses (45% of all renters).

**NUMBER OF HOUSEHOLDS BY TYPE OF DWELLING AND TENURE, FEBRUARY-MAY 1988
(*000)**

<i>Type of tenure</i>	<i>Separate house</i>	<i>Semi-detached house</i>	<i>Medium density</i>	<i>Low-rise flat/unit</i>	<i>High-rise flat</i>	<i>Total</i>
Equity holders						
Owners	2,147.8	44.2	91.8	90.7	16.0	2,390.5
Purchasers	1,508.9	26.0	42.0	48.0	6.3	1,631.2
Renters from						
State housing authority	155.5	44.9	49.6	39.7	14.6	304.2
Private landlord	457.8	47.4	184.3	245.9	23.7	959.1
Other landlords	109.0	8.2	11.0	7.8	0.4	136.4
Living rent-free	111.9	5.7	11.1	5.2	0.5	134.4
Total households	4,490.9	176.5	389.8	437.3	61.4	5,555.8

Source: *Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 (4133.0)*.

The table below shows the type of households in various tenancy situations in 1988. Nearly one-third of households that owned their dwelling outright were married couples without children. Nearly half of all purchasers were married couples with dependent children.

Among married couple households, the level of home ownership is very high. In 1988, 80 per cent of married couples, with or without dependent children, (i.e., without children at home) either owned or were

purchasing their own home. In contrast, over 60 per cent of single person households were equity holders, while less than half of single parent families, especially those with dependent children were in this position.

Nearly one-quarter of single parent households — with or without dependent children — were government rental tenants, which is much higher than the proportion of government rental tenants (5%) among the total population.

**NUMBER OF HOUSEHOLDS BY TYPE OF HOUSEHOLD AND TENURE, FEBRUARY-MAY 1988
(*000)**

<i>Type of tenure</i>	<i>Married couples with</i>			<i>Single parent with</i>			<i>Other households</i>	<i>Total households</i>
	<i>No dependents</i>	<i>Dependent and non-children only</i>	<i>Dependent children</i>	<i>Non-dependent children</i>	<i>Dependent children</i>	<i>Non-dependent children</i>		
Equity holders								
Owners	747.4	418.5	139.4	256.3	32.3	13.5	524.3	2,390.5
Purchasers	317.8	762.1	101.3	98.2	53.1	8.6	148.8	1,631.2
Renters from								
State housing authority	45.7	61.5	7.5	12.9	49.1	10.5	78.4	304.2
Private landlord	165.7	205.3	16.1	21.7	60.5	6.3	241.4	959.1
Other landlords	21.9	57.8	4.5	4.7	6.2	1.4	28.0	136.4
Living rent-free	24.9	32.0	3.8	5.7	3.8	0.5	48.7	134.4
Total households	1,323.3	1,537.2	272.6	399.4	204.9	40.7	1,069.6	5,555.8

Source: *Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 (4133.0)*.

The pattern of different types of tenure varies across States and Territories.

Victoria has the highest level of home ownership with more than 70 per cent either owning outright or paying off their home. In

contrast, the Northern Territory has less than a third in a home they own or are paying off.

Purchasers are roughly a consistent proportion (between 20 and 30%) of the population

across all States and Territories, except for the Australian Capital Territory where nearly 40 per cent are paying off their home. Home ownership levels across all States are about 40 per cent, except for the Australian Capital

Territory (18%) and in the Northern Territory (8%), reflecting a combination of the relatively recent development of the Territories, and a generally younger and more mobile population.

TYPE OF TENURE, FEBRUARY-MAY 1988
(per cent)

<i>Type of tenure</i>	<i>NSW</i>	<i>Vic.</i>	<i>Qld</i>	<i>SA</i>	<i>WA</i>	<i>Tas.</i>	<i>NT</i>	<i>ACT</i>	<i>Aust.</i>
Equity holders									
Owners	40.3	41.7	39.0	40.5	36.9	40.4	8.1	18.3	39.5
Purchasers	25.0	29.8	23.8	26.7	28.8	27.7	22.0	39.6	26.8
Renters from									
State housing authority	4.9	3.1	2.7	10.4	6.0	8.7	15.9	12.9	5.0
Private landlord	21.0	17.1	23.7	14.5	17.3	14.3	14.0	20.6	19.3
Other landlords	4.4	4.2	6.3	4.8	7.0	4.0	27.7	6.4	5.2
Living rent-free	4.4	4.1	4.4	3.1	3.9	4.9	12.3	2.2	4.2
Total households	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *Housing Survey: State and Territory Comparisons, 1988 (4134.0)*.

The Northern Territory and the Australian Capital Territory have a high proportion of renters, nearly 60 per cent and 40 per cent respectively, compared with the Australian average of 30 per cent. The Territories also have the highest proportion of government tenants, along with South Australia, all over 10 per cent, compared with an Australian average of only five per cent.

ACCESSIBILITY AND AFFORDABILITY OF HOUSING

The ability of people to acquire housing depends on two considerations — their ability to buy or rent housing in the first instance (housing accessibility) and their ability to subsequently maintain their housing financial commitments (house affordability). While not the only factor, the cost of acquiring and/or maintaining housing is a major component in the cost of living. Some measures of the cost and financing of housing are shown in the following statistics.

The unit used in the statistics on housing accessibility and affordability varies between 'household' and 'income unit', depending on the subject. For statistical purposes a household is a social unit, a group of people who live together in a single dwelling with common housekeeping arrangements. An income unit, in simple terms, is more in the nature of an economic unit, which may comprise only some members of one or more households, e.g., a married couple owning, buying or maintaining the cost of a dwelling, but excluding dependent or independent children living with them. To add some perspective to the respective statistics shown under these different terms, it is estimated that there were 5.6 million households and 6.2 million income units in 1988.

House Price Index

The prices of established houses and project homes over recent years are shown in the following tables.

ESTABLISHED HOUSE PRICE INDEX NUMBERS
(Base of each index: September quarter 1986 = 100.0)

<i>Period</i>	<i>Sydney</i>	<i>Melbourne</i>	<i>Brisbane</i>	<i>Adelaide</i>	<i>Perth</i>	<i>Hobart</i>	<i>Darwin</i>	<i>Canberra</i>
1987-88	121.1	109.9	109.3	103.9	112.6	105.2	98.3	104.8
1988-89	176.9	142.0	135.9	111.2	153.6	116.1	100.4	121.3
1989-90	185.9	155.4	157.7	121.8	172.6	124.6	101.6	129.2
1990-91	186.8	148.0	180.3	129.4	163.7	132.4	111.0	138.6
PERCENTAGE CHANGE FROM PREVIOUS YEAR								
1988-89	46.1	29.2	24.3	7.0	36.4	10.4	2.1	15.7
1989-90	5.1	9.4	16.0	9.5	12.4	7.3	1.2	6.5
1990-91	0.5	-4.8	14.3	6.2	-5.2	6.3	9.3	7.3

Source: *House Price Indexes: Eight Capital Cities (6416.0)*.

PROJECT HOME PRICE INDEX NUMBERS
(Base of each index: September quarter 1986 = 100.0)

<i>Period</i>	<i>Sydney</i>	<i>Melbourne</i>	<i>Brisbane</i>	<i>Adelaide</i>	<i>Perth</i>	<i>Hobart</i>	<i>Darwin</i>	<i>Canberra</i>
1987-88	112.1	107.4	110.5	101.1	109.4	106.3	106.3	101.8
1988-89	139.6	121.0	135.9	110.7	134.2	114.9	116.2	109.4
1989-90	152.8	132.9	152.6	115.1	143.0	122.9	137.8	119.4
1990-91	157.3	137.2	159.1	120.3	131.5	130.8	145.1	132.1
PERCENTAGE CHANGE FROM PREVIOUS YEAR								
1988-89	24.5	12.7	23.0	9.5	22.7	8.1	9.3	7.5
1989-90	9.5	9.8	12.3	4.0	6.6	7.0	18.6	9.1
1990-91	2.9	3.2	4.3	4.5	-8.0	6.4	5.3	10.6

Source: *House Price Indexes: Eight Capital Cities (6416.0)*.

The price index of materials used in house building is contained in the chapter on Prices.

Home buyers

In early 1988 nearly 27 per cent of all income units were paying off their dwelling. Of the 1.6 million home purchasers, nearly 60 per cent had bought their home from 1983 to 1987 inclusive. Only about 10 per cent of all income units paying off their home loan

had purchased before 1973. As would be expected there has been an upward creep in the amount borrowed for the purchase of homes. For recent home purchasers nearly half had borrowed between \$30,000 and \$50,000, and nearly a quarter had borrowed between \$50,000 and \$70,000. The following data excludes all those home purchasers who had paid off their dwelling with either their income or the proceeds of the sale of another dwelling.

**NUMBER PURCHASING THEIR HOME, BY AMOUNT BORROWED AND YEAR
OF PURCHASE, FEBRUARY-MAY 1988**
(^{'000} income units)

<i>Amount borrowed</i>	<i>Before 1968</i>	<i>1968- 1972</i>	<i>1973- 1977</i>	<i>1978- 1982</i>	<i>1983 or later</i>	<i>Total</i>
Under \$10,000	59.3	28.3	6.5	2.9	8.4	105.3
\$10,000 to 19,999	16.4	32.1	72.2	41.3	41.0	203.0
\$20,000 to 29,999	4.5	9.0	60.6	127.2	140.9	342.2
\$30,000 to 39,999	1.5	4.1	22.0	94.9	217.9	340.3
\$40,000 to 49,999	1.8	1.4	7.2	51.2	205.4	267.1
\$50,000 to 59,999	0.2	0.8	5.9	21.0	147.8	175.7
\$60,000 to 69,999	..	0.5	1.6	10.1	79.1	91.2
\$70,000 to 79,999	..	0.3	1.8	1.7	36.4	40.3
\$80,000 to 89,999	0.4	..	0.5	3.2	17.7	21.8
\$90,000 to 99,999	..	..	0.4	1.7	18.8	20.8
\$100,000 or more	0.5	0.5	1.2	4.7	25.5	32.5
'Don't Know'	0.8	..	0.9	0.8	0.3	2.7
Total	85.2	77.1	180.7	360.5	939.3	1,642.8

Source: *Housing Survey: Housing Finance of Purchasers, 1988 (4131.0)*.

The table below shows the relationship between mortgage payments and income for people paying off their home. Married couple income units paid, on average, more in mortgage payments (\$115 per week) than one parent income units (\$88 per week) and one person income units (\$99 per week). However, one parent income units paid the greatest proportion of their income in mortgage payments, on average one-quarter of their income.

For married couples and one person income units, the average weekly mortgage payment was higher for those in flats or units than for those in houses. However for one parent income units, the greatest mortgage payments were paid (on average \$115 per week) by those in medium density housing (flats/units). This group paid the highest proportion of their income as mortgage payments, compared with all other groups in all types of dwellings.

**MORTGAGE PAYMENTS AND INCOME OF THOSE PURCHASING THEIR HOME IN 1988
BY TYPE OF DWELLING AND INCOME UNIT**

<i>Type of income unit</i>	<i>Separate house</i>	<i>Medium density</i>	<i>Flats/ units</i>	<i>Total</i>
Married couple				
Mean weekly mortgage payments (\$)	113	149	159	115
Mean weekly income (\$)	685	837	787	689
Mortgage payments as a proportion of income (%)	16.5	17.8	20.2	16.7
One parent				
Mean weekly mortgage payments (\$)	88	115	72	88
Mean weekly income (\$)	356	432	518	365
Mortgage payments as a proportion of income (%)	24.6	26.6	14.0	24.2
One person				
Mean weekly mortgage payments (\$)	95	103	110	99
Mean weekly income (\$)	428	449	495	445
Mortgage payments as a proportion of income (%)	22.2	23.0	22.3	22.3

Source: *Survey of Income & Housing Costs and Amenities: Housing Occupancy and Costs, Australia, 1988 (4130.0)*.

The following table on first home buyers (during the years 1988 to 1990) reflects the

relationship between income and the price of dwellings. Of houses costing less than \$62,500,

40 per cent were purchased by households earning less than \$27,500 per year. In contrast, of those houses costing more than

\$120,000, two-thirds were purchased by households earning more than \$42,500 per year.

NUMBER OF FIRST HOMES PURCHASED BY PRICE AND HOUSEHOLD INCOME, 1988-90
(**'000**)

<i>Household income</i>	<i>Purchase price</i>			
	<i>Less than \$62,500</i>	<i>\$62,500- \$84,999</i>	<i>\$85,000- \$119,999</i>	<i>\$120,000 or more</i>
Less than \$27,500	30.9	13.2	16.3	13.3
\$27,500 to \$42,499	26.1	27.3	15.5	9.8
\$42,500 to \$54,999	14.6	18.7	18.3	14.1
\$55,000 or more	5.8	8.2	26.3	31.7
Total dwellings	77.3	67.4	76.4	69.0

Source: *First Home Buyers, Australia, Preliminary, 1988-1990 (4135.0)*.

The following table shows that first home buyers between 1988 and 1990 formed a larger proportion of all home purchasers in

Sydney and Melbourne than the average for Australia which was 31 per cent.

FIRST HOME BUYERS BY GEOGRAPHIC AREA, 1988-90

	<i>Number of first home buyers (<i>'000</i>)</i>	<i>Per cent of all buyers(a)</i>
Sydney	57.2	37
Melbourne	55.6	35
Brisbane	19.3	23
Perth	24.1	29
Other capital cities	29.8	34
Rest of Australia	104.1	28
Australia	290.2	31

(a) As a proportion of all owner occupied dwellings purchased during 1988-1990.

Source: *First Home Buyers, Australia, Preliminary, 1988-1990 (4135.0)*.

For first home buyers from 1988 to 1990, 30 per cent of deposits were \$40,000 or more while only 18 per cent of deposits were less than \$5,000. For those deposits which were less than \$5,000, nearly 70 per cent were by households earning less than \$42,500 per year. While the trend of deposits is similar to that of purchase prices (i.e., the size increases with the size of the income), an exception exists with large deposits.

Households earning less than \$27,500 accounted for 30 per cent of deposits that were greater than \$40,000. These may be households which have undergone a reduction in income e.g., retirees buying their first home with a retirement lump sum, young couples with a family and one partner out of the workforce, and retirees settling down in an area after a change from job requiring them to move regularly.

**NUMBER OF FIRST HOMES PURCHASED, BY DEPOSIT SIZE AND
HOUSEHOLD INCOME, 1988-90**
(^{'000})

<i>Household income</i>	<i>Deposit size</i>			
	<i>Less than \$5,000</i>	<i>\$5,000- \$17,499</i>	<i>\$17,500- \$39,999</i>	<i>\$40,000 or more</i>
Less than \$27,500	20.7	13.2	13.4	26.4
\$27,500 to \$42,499	15.4	26.8	20.3	16.2
\$42,500 to \$54,999	9.1	22.4	14.4	19.9
\$55,000 or more	6.6	19.4	20.7	25.3
Total dwellings	51.8	81.8	68.8	87.8

Source: *First Home Buyers, Australia, Preliminary, 1988-1990 (4135.0)*.

Most first home buyers, regardless of the household income, achieved their deposit through savings. Among those households earning less than \$27,500, 60 per cent obtained their deposits through savings, while

15 per cent used loans or gifts from family or friends. Among households earning more than \$55,000 per year, 80 per cent obtained their deposits through savings.

**NUMBER OF FIRST HOMES PURCHASED, BY MAIN SOURCE OF DEPOSIT AND
SIZE OF HOUSEHOLD INCOME, 1988-90**
(^{'000})

<i>Main source of deposit</i>	<i>Household income</i>				<i>Total</i>
	<i>Less than \$27,500</i>	<i>\$27,500- \$42,499</i>	<i>\$42,500- \$54,999</i>	<i>\$55,000 or more</i>	
Sale of land	1.5	5.4	3.3	1.5	11.7
Sale of assets	0.7	4.0	1.5	0.6	6.8
Savings	44.4	54.3	51.5	57.5	207.7
Personal loan from financial institution	2.4	0.9	—	0.5	3.8
Loan/gift/bequest from family/friends	11.2	7.0	5.3	5.9	29.4
Other	13.5	7.2	4.2	5.9	30.8

Source: *First Home Buyers, Australia, Preliminary, 1988-1990 (4135.0)*.

Housing finance

The following table presents statistics of secured housing finance commitments made by significant lenders to individuals for the construction or purchase of dwellings for owner occupation.

In 1990-91, a total of \$20,652.8 million was committed for the purchase of 291,984

dwellings. Of this, 74.7 per cent was used to purchase established dwellings, 18.2 per cent to finance construction of new dwellings and the remainder was used to purchase newly erected dwellings. Banks remain the predominant lenders and in 1990-91 provided \$15,134.2 million to individuals in finance commitments.

**HOUSING FINANCE FOR OWNER OCCUPATION: NUMBER OF DWELLING UNITS AND
VALUE OF COMMITMENTS TO INDIVIDUALS, BY TYPE OF LENDER**

	<i>Banks</i>	<i>Permanent building societies</i>	<i>Other lenders(a)</i>	<i>Total</i>
CONSTRUCTION OF DWELLINGS				
		—	number —	
1988-89	63,567	7,264	4,589	75,420
1989-90	52,091	3,576	6,021	61,688
1990-91	52,256	4,979	5,143	62,378
		—	\$ million —	
1988-89	3,335.1	443.4	246.8	4,025.3
1989-90	2,862.0	245.2	364.3	3,471.5
1990-91	3,043.9	372.9	352.1	3,768.9
PURCHASE OF NEWLY ERECTED DWELLINGS				
		—	number —	
1988-89	14,213	1,941	3,195	19,349
1989-90	8,148	1,309	4,861	14,318
1990-91	10,117	2,260	4,034	16,411
		—	\$ million —	
1988-89	922.3	135.0	180.2	1,237.5
1989-90	589.8	108.0	387.5	1,085.3
1990-91	773.2	201.5	345.5	1,320.2
PURCHASE OF ESTABLISHED DWELLINGS				
		—	number —	
1988-89	204,559	36,619	23,721	264,899
1989-90	150,276	21,179	30,687	202,142
1990-91	155,351	29,853	28,001	213,205
		—	\$ million —	
1988-89	13,730.5	2,346.1	1,448.4	17,525.0
1989-90	10,607.2	1,525.7	2,131.9	14,264.8
1990-91	11,317.1	2,143.0	1,963.1	15,423.2
TOTAL				
		—	number —	
1988-89	282,339	45,824	31,505	359,668
1989-90	210,515	26,064	41,569	278,148
1990-91	217,724	37,092	37,178	291,994
		—	\$ million —	
1988-89	17,987.9	2,924.4	1,875.5	22,787.8
1989-90	14,059.1	1,878.9	2,883.7	18,821.7
1990-91	15,134.2	2,857.9	2,660.7	20,652.8

(a) Includes cooperative housing societies.

Source: Unpublished ABS housing finance statistics.

Ongoing cost of housing

In addition to the initial cost of acquiring housing, there are the ongoing costs such as water and general rates, mortgage repayments, rent or board payments.

The table below shows mean weekly housing costs by type and size of income unit. Housing costs for married couples with dependent children show an average of \$85 per week, and for single persons over 65 years only \$16 per week. Generally, the cost of housing

rose with the income, although there were some variations. In particular, the lowest income group (under \$116) for one person (i.e., single) and one parent income units showed greater mean weekly housing costs than the next (higher) income group (\$116 to \$164). Among married couple income groups housing costs were higher for those income units earning less than \$164 per week (i.e., the lowest two income decile groups), than for those earning between \$165 and \$300 per week (i.e., the next two income decile groups).

**MEAN WEEKLY HOUSING COSTS, BY TYPE AND SIZE OF INCOME UNIT(a)
FEBRUARY-MAY 1988**

Type of income unit	Total weekly income decile groups										
	Less than \$116	\$116-\$164	\$165-\$215	\$216-\$299	\$300-\$383	\$384-\$465	\$466-\$576	\$577-\$702	\$703-\$918	Highest 10%	All groups
Married couples											
Without dependent children	70	29	19	23	34	39	47	68	83	110	53
With dependent children	87	77	54	58	65	76	79	83	91	117	85
One parent	51	36	59	61	73	78	74	91	126	110	62
One person aged											
15-24 years	39	41	43	47	52	66	73	71	102	123	52
25-64 years	42	27	38	47	58	65	80	93	94	108	58
65 years and over	15	15	17	19	25	14	18	29	26	21	16
Total	50	23	30	40	53	62	70	79	88	113	61
Mean weekly income	54	130	192	255	338	421	515	634	799	1,299	465

(a) Excludes one person income units renting from parents/relatives in the same household, or income units living rent-free.

Source: Survey of Income & Housing Costs and Amenities: Housing Occupancy and Costs, Australia, 1988 (4130.0).

In the table above, care should be taken in interpreting the data in the first income decile (i.e., income units earning less than \$116 per week). The relatively high housing costs in this category can be explained partly by the fact that at the time of the survey interview, some income units did not include any person who had a job or was receiving income of any significance. This could be because they:

- are relying on irregular income;
- have recently become unemployed; or
- are in the process of changing their job.

The table below shows housing costs for income units by nature of occupancy. Housing costs are highest for purchasers who spent an average of \$126 per week on housing. Also, amongst renters, those renting privately on average pay almost twice as much as the State housing authority tenant. Other renters, on average, pay less than State housing authority tenants when their incomes are high but more when their incomes are low. This is probably because their rents do not significantly vary with income, whereas housing authority tenants pay rent according to income.

**MEAN WEEKLY HOUSING COSTS BY TYPE OF TENURE AND SIZE OF INCOME UNITS(a),
FEBRUARY-MAY 1988**

Type of tenure	Total weekly income decile groups										
	Less than \$116	\$116-\$164	\$165-\$215	\$216-\$299	\$300-\$383	\$384-\$465	\$466-\$576	\$577-\$702	\$703-\$918	Highest 10%	All groups
Equity holders											
Owners	14	9	11	12	14	15	15	16	18	21	14
Purchasers	143	53	63	85	98	109	115	123	134	173	126
Renters from											
Private landlord	80	59	79	77	76	81	92	105	115	161	88
Government	29	29	38	48	66	73	72	79	82	74	46
Other landlords	42	36	45	41	47	49	51	52	45	61	46
Total	50	23	30	40	53	62	70	79	88	113	61
Mean weekly income	54	130	192	255	338	421	515	634	799	1,299	465

(a) Excludes one person income units renting from parents/relatives in the same household, or income units living rent-free.

Source: Survey of Income & Housing Costs and Amenities: Housing Occupancy and Costs, Australia, 1988 (4130.0).

Ongoing housing costs as a proportion of income are an effective way of looking at affordability of housing across income units. For all types of dwellings, income units pay about 13 per cent of mean weekly income on housing. For separate houses, 12 per cent of income is spent on housing. However in flats,

units and other dwellings, the percentages were higher (19% and 16% respectively). New South Wales was the State with generally the greatest proportion of income spent on housing regardless of the type of dwelling, closely followed by the Australian Capital Territory.

**MEAN WEEKLY INCOME SPENT ON HOUSING, BY TYPE OF DWELLING
FEBRUARY-MAY 1988
(per cent)**

<i>State/Territory</i>	<i>Separate house</i>	<i>Flat/units</i>	<i>Other dwellings</i>	<i>Total</i>
New South Wales	12.7	20.7	18.2	14.1
Victoria	12.3	16.8	15.1	12.9
Queensland	12.4	17.1	17.3	13.0
South Australia	11.5	17.3	14.3	12.1
Western Australia	11.0	18.5	14.0	11.6
Tasmania	10.4	21.3	16.3	11.0
Northern Territory	11.8	14.0	15.4	12.7
Australian Capital Territory	13.2	19.8	16.7	13.8
Australia	12.0	19.0	15.9	12.9

Source: *Housing Survey: State and Territory Comparisons, 1988 (4134.0)*.

The table below shows the proportion of income that different kinds of income units pay towards housing. As might be expected those paying off their homes and renters (government or private sector) pay a higher per cent of their income towards housing than those who own their home outright.

Different family structures show marked variations in the proportional outlay towards

housing. One parent income units, regardless of type of tenancy, pay nearly one-quarter of their income on housing, while married couples pay less than one-eighth.

The group that appears to suffer the most financial stress are single parents who rent in the private sector. This group pays 37 per cent of their income towards housing.

**HOUSING COSTS AS A PERCENTAGE OF INCOME(a) BY TYPE OF INCOME UNIT
BY NATURE OF OCCUPANCY, FEBRUARY-MAY 1988
(per cent)**

<i>Nature of occupancy</i>	<i>Type of income unit</i>			
	<i>Married couple</i>	<i>One parent</i>	<i>One person</i>	<i>Total</i>
Equity holders				
Owners	2.9	4.8	4.9	3.3
Purchasers	18.9	27.7	24.9	19.7
Renters from				
State housing authority	16.2	19.2	20.9	17.4
Private landlord	20.4	37.0	20.7	21.4
Other landlords	7.9	22.2	14.8	11.5
Total households	12.2	24.1	16.3	13.4

(a) Excludes one person income units renting from parents or relatives in the same household, and all income units living rent-free.

Source: *Unpublish ABS statistics from the 1988 Housing Survey*.

GOVERNMENT INITIATIVES

Construction Industry Development Strategy

In December 1990 at a major industry gathering at Parliament House, the Prime Minister launched the Building and Construction Industry Reform Strategy.

The Strategy was subsequently developed by working parties reporting to the Ministers for Science and Technology; Employment, Education and Training; Industrial Relations; and Administrative Services. The proposals have now been finalised and Cabinet agreed to funding (with certain conditions) on 25 July 1991, subject to the formal agreement of the industry.

The Strategy is a framework for joint action by the industry and Government to address micro-economic reform in the industry. Its existence reflects the crucial importance of the construction sector to Australia's economic performance.

The Strategy targets seven key areas to be addressed:

- management of the construction process;
- technical efficiency;
- industrial relations;
- export orientation;
- the role of governments;
- understanding of the industry structure and operation; and
- the Public Works Enabling Mechanism.

National Housing Strategy

The National Housing Strategy was established in June 1990 and works closely with the Department of Health, Housing and Community Services.

The Strategy aims to develop a policy of housing reform that responds to the diverse and changing needs of all Australians and which can be sustained over the next two decades. To achieve this, in line with its terms of reference it will seek to:

- gain a better understanding of Australia's housing needs now and in the future;
- examine innovative mechanisms that will make quality housing more affordable, particularly for people with low to moderate incomes;

- focus on what is appropriate housing, giving special attention to those who are poorly housed or disadvantaged, and to people's differing needs through their lives;
- determine mechanisms which can regulate and assist the efficient supply of housing; and
- explore ways of obtaining better links between housing, employment opportunities, community services and aspects of urban infrastructure, such as transportation, to ensure minimum locational disadvantage.

The development of the Strategy is being undertaken in close cooperation with State Housing Authorities and in consultation with relevant Commonwealth, State, Territory and local government, non-government and other agencies.

A list of issue papers can be found in the bibliography at the end of the chapter.

Housing Industry Development Strategy

The Housing Industry Development Strategy was announced at the meeting of State and Federal Planning and Housing Ministers in December 1990. The strategy is being developed by the recently formed Australian Housing Industry Development Council, comprising representatives of industry, unions, manufacturers and the three levels of government.

The vision behind the strategy is for a housing industry which is more efficient, flexible and concerned with quality, producing a greater range of housing products, and which understands and is committed to the concept of international competitiveness.

The strategy's objectives are being achieved through the following three programs:

- The Regulatory Reform Program which aims to improve the regulatory environment within which the housing industry operates.
- The Urban Form and Land Use Program which aims to promote effective and efficient investment in land and infrastructure, increase the range of choices available in the housing market, and increase the supply of attached housing forms.
- The Industry Efficiency Program which deals with issues including skills formation, innovation, research and development, internationalisation, the removal of distortions in the labour market, and aspects of land supply.

Housing Development Program

The Housing Development Program (HDP) is a three year program that was established at the 1989 Planning Ministers' Conference. The aim of the program is to develop and promote cooperative Federal, State and Territory initiatives aimed at overcoming housing supply constraints.

The major objectives of the HDP are to:

- increase the flexibility and efficient use of residential land and urban infrastructure; and
- promote community acceptance of greater variety in housing, including higher density development.

Indicative Planning Council for the Housing Industry

The Indicative Planning Council (IPC) is a forum to promote and facilitate informed discussion between industry and government on short-term prospects for the industry, its supply of resources, projections of underlying demand for housing, and issues affecting industry activity and efficiency. It is composed of government and industry representatives, and has State and Territory committees.

The IPC has also commissioned a number of studies on issues relating to long-term demand for housing; the factors that determine interstate and interregional migration; and how to determine the optimum buffer stocks of residential land.

Commonwealth and State government housing assistance

A range of assistance programs has been developed to target assistance to households in

the owner-occupied, public housing and private rental housing sectors. The Government provides funds for public housing, supported accommodation services, crises accommodation, mortgage and rent relief and home purchase assistance to individuals and families.

The bulk of Commonwealth financial assistance for housing is provided to the States and Territories through the Commonwealth-State Housing Agreement (CSHA). A new Agreement, covering all States, the Northern Territory and for the first time the Australian Capital Territory, commenced operation on 1 July 1990. The Agreement will run for a 10 year period and be reviewed every three years.

A housing authority exists in each State and Territory which is responsible for home construction, home loans, and the provision of homes on a rental basis, as follows:

- New South Wales — Department of Housing;
- Victoria — Ministry of Housing and Construction;
- Queensland — Department of Housing and Local Government;
- South Australia — South Australia Housing Trust;
- Western Australia — State Housing Commission of Western Australia;
- Tasmania — Tasmanian Development Authority and Department of Community Services;
- Northern Territory — Department of Lands and Housing; and
- Australian Capital Territory — The ACT Housing Trust.

Details of their activities were contained in *Year Book Australia 1991*.

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- House Price Indexes: Eight Capital Cities (6416.0)*
- Housing, Australia (1320.0)*
- Housing Survey: Housing Finance of Purchasers, 1988 (4131.0)*
- Housing Survey: Housing History and Intentions, 1988 (4132.0)*
- Housing Survey: State and Territory Comparisons, 1988 (4134.0)*
- National Energy Survey: Annual Consumption of Reticulated Energy by Households, Australia (8213.0)*
- National Energy Survey: Household Appliances, Facilities and Insulation, Australia (8212.0)*
- Public Sector Construction Activity, Australia, 1988-89 (8775.0)*
- Survey of Income & Housing Costs and Amenities: Characteristics of Dwellings, Australia, 1988 and 1990 (4133.0)*
- Survey of Income & Housing Costs and Amenities: Housing Occupancy and Costs, Australia, 1988 and 1990 (4130.0)*

Details for particular States are available from publications issued regularly by the Deputy Commonwealth Statistician in each State.

BIBLIOGRAPHY — continued**Other Publications**

Publication schedule of the National Housing Strategy as at September 1991:

March 1991 Issues Paper 1: Australian Housing

April 1991 Issues Paper 2: The Affordability of Australian Housing

April 1991 Issues Paper 3: Financing Australian Housing

October 1991 Issues Paper 4: Efficient Supply of Affordable Land & Housing

May 1992 Issues Paper 5: Links Between Housing & Services

June 1992 Issues Paper 6: Groups with Special Housing Needs

September 1992 Issues Paper 7: Delivery & Management of Housing Services

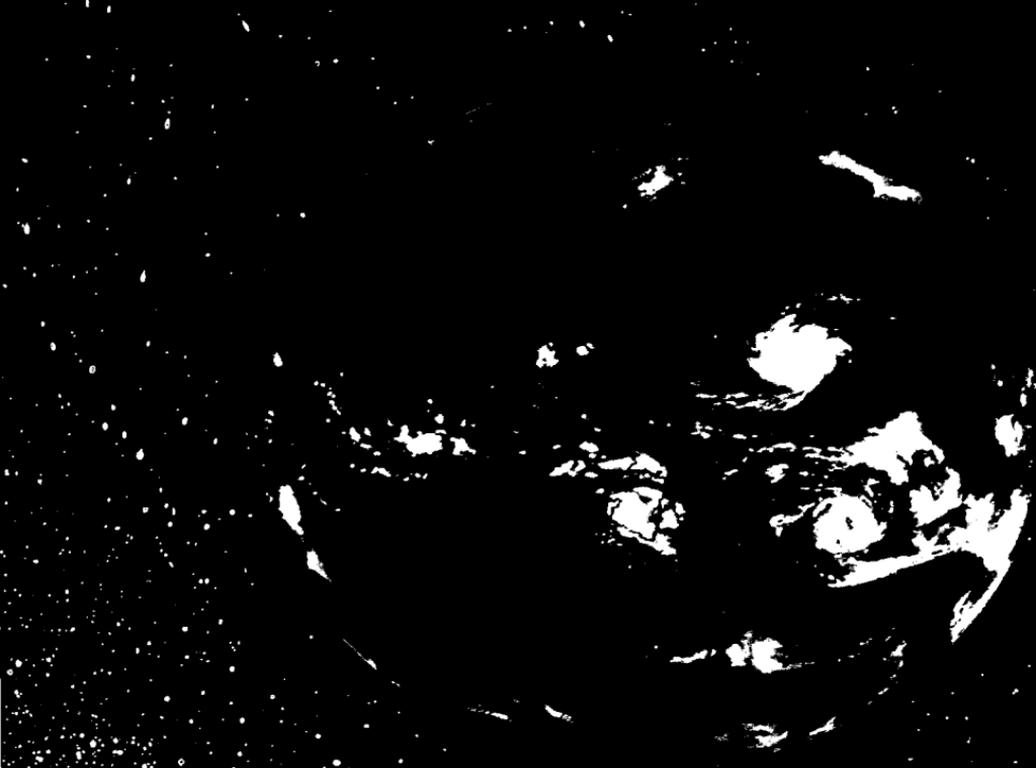
November 1992 Issues Paper 8: The National Housing Strategy

The annual reports of the Commonwealth and State Government Housing Authorities show further details of government activities in the field of housing.

FOR MORE INFORMATION

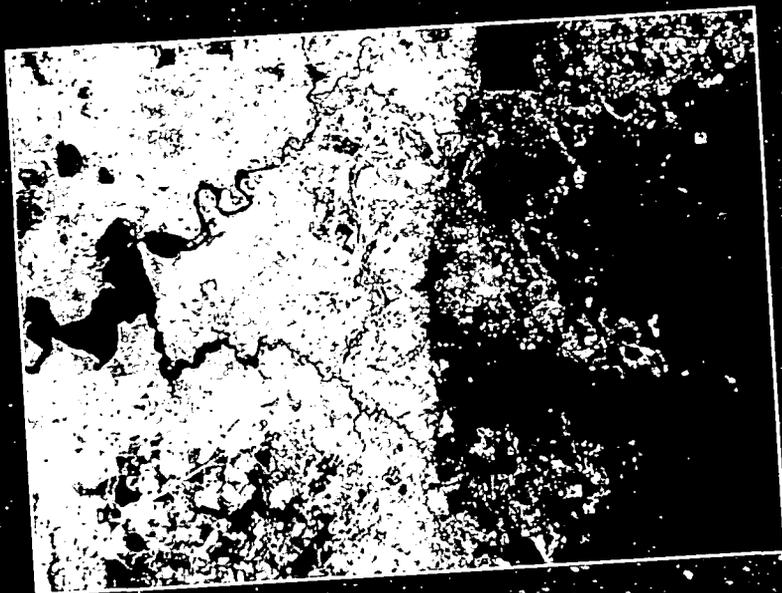
The ABS has a far wider range of information on Australia than that contained in the *Year Book*. Information is available in the form of regular publications, electronic data services, special tables and from investigations of published and unpublished data.

For further information contact ABS Information Services at one of the addresses listed on the page facing the Introduction to the *Year Book*.

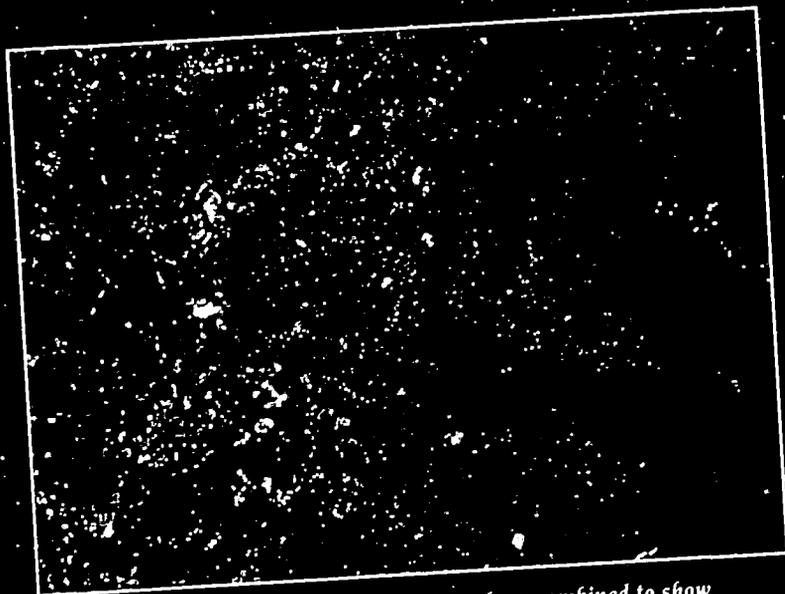


GMS - 4 images, 9 January 1992. The full disk picture shows tropical cyclones AXEL (north Pacific); BETSY (south Pacific) and MARK (Gulf of Carpentaria). The detail of Australia below shows MARK, which later crossed the west coast of Cape York Peninsula.

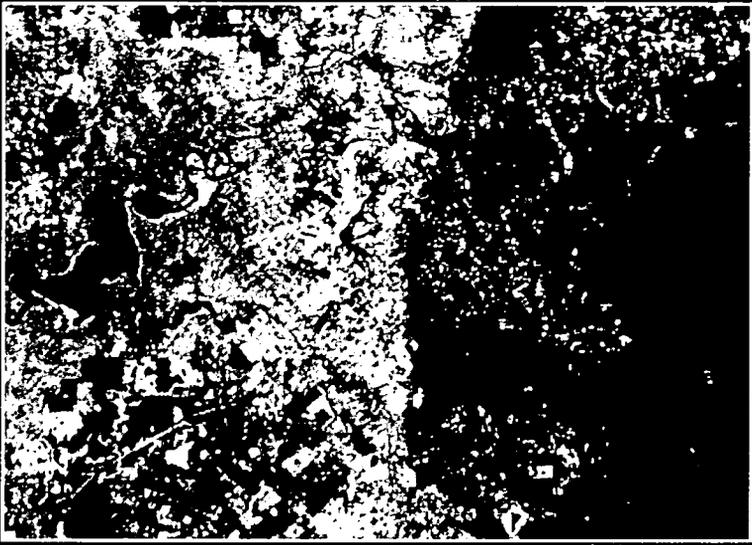




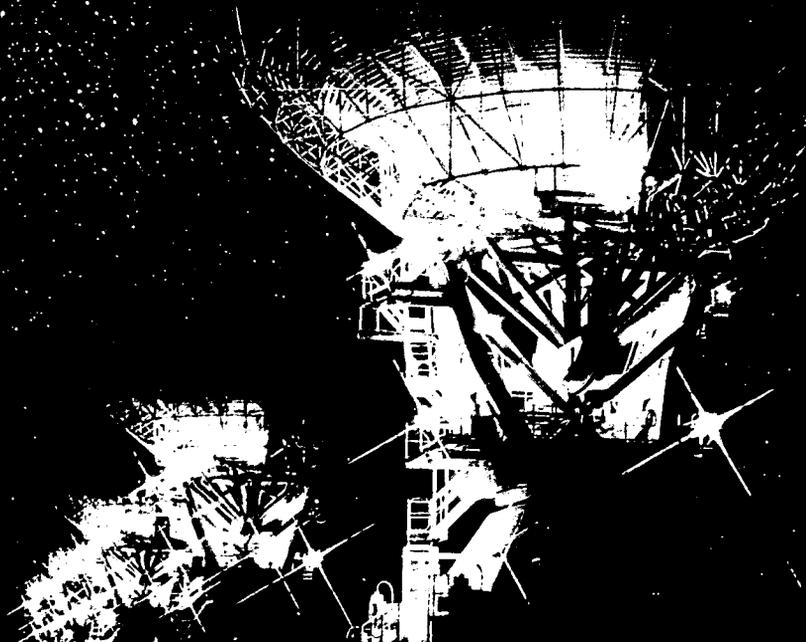
Perth by Landsat satellite, 1972

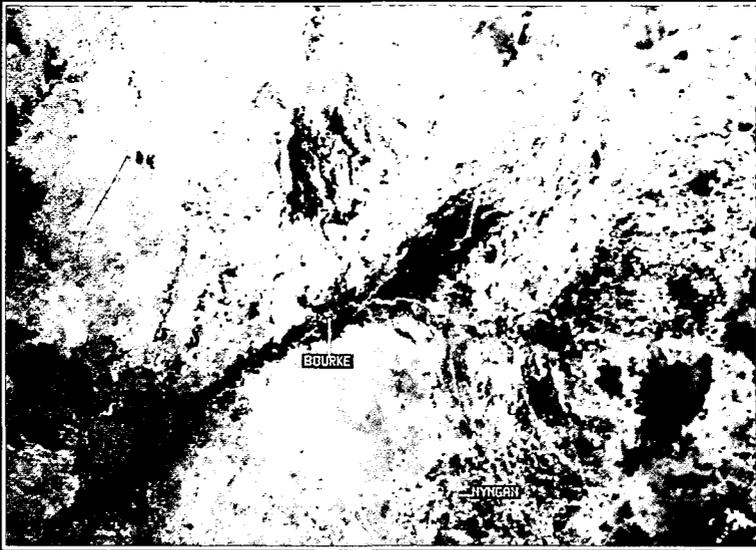


Information from the two images at top have been combined to show changes in vegetation between 1972 and 1988. Areas shown in red have experienced loss of vegetation cover, mainly due to urban growth. Green areas have gained vegetation.

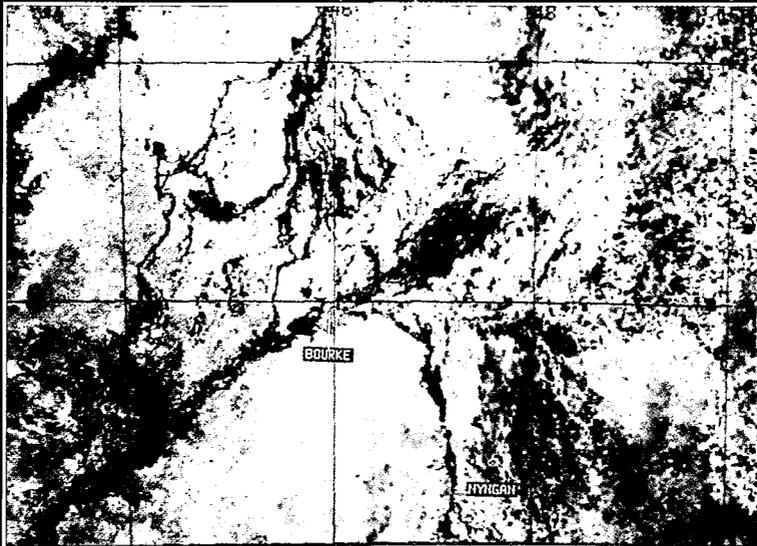


Perth in 1988 (Landsat image)





Portions of images from the NOAA 11 meteorological satellite, before (above) and after (below) the Nyngan floods, March/April 1990.



International Space Year

(This special article has been contributed by Jeff Kingwell, Office of Space Science and Applications, CSIRO, Canberra.)

As 1992 is designated as 'International Space Year', it is appropriate to review Australia's place and participation in the various fields of activity in space which have increasing relevance for every day life.

SPACE IN AUSTRALIA'S HISTORY

There can be few countries whose history is as closely associated with space as Australia's.

Aboriginal society has continuously observed the heavens for longer than any other culture. Besides creating stories which helped them interpret the relationship between humans and nature, native Australians also used the changing star patterns to guide them to seasonal food sources. The arrival of Captain Cook's 'Endeavour' along the east coast in 1770 was a postscript to the real purpose of his journey — the observation of the passage of the planet Venus across the face of the Sun, in order to improve the accuracy of methods then used to calculate longitude.

When Governor Phillip led the First Fleet to the new colony of New South Wales in 1788, he was accompanied by the first astronomer of the modern period of Australian history, Lieutenant William Dawes. Dawes made many astronomical and chronological measurements (and the earliest recorded Australian weather observations) from an observatory on the western side of Sydney Cove, and this site soon figured prominently in the early intellectual life of the new colony.

Astronomy

Australia — a pioneer in the science of radioastronomy — has world-famous observatories in this field, particularly the Australia Telescope National Facility hosted by CSIRO. The 30 year old Parkes radio telescope, together with seven smaller and newer radio telescopes at Narrabri and Siding Springs, form the Australia Telescope Long Baseline Array. Signals from natural radio

sources can be collected simultaneously by these sensitive antenna. When operated in this way, the Australia Telescope is much more powerful than any single radio telescope.

Past achievements of the Parkes radio telescope include its prominent role in the discovery of the first Quasar (intense astronomical energy sources, the most distant known), and tracking the encounter in 1986 of the European space probe 'Giotto' with Halley's Comet. Current plans of the Australia Telescope include its use in conjunction with Russian and Japanese-led space missions in the mid-1990s. These will use 10 metre radio telescopes on spacecraft in highly elliptical earth orbit to resolve fine details of quasars and galaxies. Part of the instrumentation for the Russian mission, 'Radioastron', has been designed by CSIRO and made by British Aerospace Australia of Adelaide and MITEC of Brisbane, with the joint funding of CSIRO and the Australian Space Office.

Other important astronomical facilities, relying on optical observations rather than detection of radiowaves, are also based in Australia. These include the Anglo-Australian Observatory, the UK Schmidt Telescope, and the Mount Stromlo and Siding Springs Observatories. Australian astronomers from these institutions have had a successful history of participation in foreign space observatory missions, such as the US Hubble Space Telescope and the European Hipparcos.

Defence interests

Australia's military space involvement commenced in 1946 with the Anglo-Australian Joint Project. In its most active period, from around 1955 to 1967, this Project employed thousands of personnel in the township of Woomera and over a rocket test range of some 20,000 square kilometres in central Australia.

Current military space activities continue through the operation of some of the largest satellite ground stations in the world. These, Pine Gap near Alice Springs and Nurrungar

near Woomera, are joint United States (US)-Australian bases having a total staff of around 1,000, of whom approximately half are American. Pine Gap is a Signals Intelligence station, receiving information from US Ryolite, Vortex, Magnum, Chalet and other military satellites. Commentators have estimated that Pine Gap has a replacement value exceeding \$US2 billion. Nurrungar is a control and data processing station for US satellites giving early warning of hostile rocket and missile launches.

A third large military satellite ground station is under construction in Kojarena, near Geraldton. This is wholly under Australian control, through the Defence Signals Directorate. Its capital cost exceeds \$100 million.

Australian satellites and payloads

It was from Woomera on Wednesday 29 November 1967 that an Australian scientific satellite, WRESAT, was launched into earth orbit, using a US Redstone rocket. Australia thus became the fourth nation in the world (following the USSR, the USA, and France) to place into earth orbit a satellite launched from its own territory.

WRESAT carried instruments designed and built by the then Department of Supply's Weapons Research Establishment and the University of Adelaide to measure properties of the earth's upper atmosphere, solar radiation, and the temperature of the sun's outer atmosphere or corona. Interestingly, given current concerns about stratospheric ozone depletion, one instrument on WRESAT (which proved to be the only experiment on board to malfunction) was designed to study ozone concentrations at very high altitudes.

Woomera was also the launch site for the UK 'Prospero' scientific and engineering test satellite, on a Black Arrow rocket on 28 October 1971. No further satellites have been launched from Woomera, and most of the range equipment was either destroyed or sold for scrap over 10 years ago.

Proposals have been made to reopen Woomera as a satellite launch site (in addition to suggestions, discussed for about six years, to establish a commercially-operated satellite launch centre on the Cape York Peninsula). To date, however, attempts to re-establish an Australian

satellite launching capability remain inconclusive.

Several Australian payloads have been launched since 1967 from overseas locations. These include the OSCAR V amateur radio satellite made at the University of Melbourne (launched 23 January 1970); flights in 1985 and 1988 on the US Space Shuttle of experiments in the aggregation of human red blood cells, designed by the late Dr Leopold Dintenfass of Sydney; and flights of influenza virus crystal growth experiments on the Russian MIR space station and the US Shuttle. The latter experiments were designed by Dr Graeme Laver at the John Curtin School of Medical Research in Canberra.

One of the most significant Australian payloads of the last two decades was the Endeavour prototype ultraviolet space telescope, carried on board the US Space Shuttle on 23 January 1992. The \$4.5 million telescope, conceived at the Australian National University, was funded by the Department of Industry, Technology and Commerce and manufactured in Canberra by AUSPACE Ltd. It was designed to collect information on the Magellanic Clouds and other young, energetic astronomical sources of ultraviolet radiation.

Unfortunately, because of the nature of the orbit of the Shuttle which carried the telescope, it is doubtful whether useful scientific information was obtained from the mission. Nevertheless the flight does demonstrate the growing capabilities of a small but significant group of Australian companies which have obtained sophisticated engineering skills as a consequence of space projects funded through the Government's National Space Program, and from the research and development efforts in Universities and CSIRO.

Weather satellites

Australia's regular use of satellites for practical applications commenced around 1963, with the TIROS weather satellite. Routine information from Japan's Geostationary Meteorological Satellite and the US National Oceanic and Atmospheric Administration (NOAA) series now form an essential part of the Australian Bureau of Meteorology's tool kit for forecasting tropical cyclone intensification and movement, and for general forecasting purposes.

Information from the NOAA satellites is gathered at Bureau of Meteorology, university, CSIRO and government ground stations in Darwin, Townsville, Sydney, Melbourne, Hobart, Perth, Alice Springs and Casey (Australian Antarctic Territory). These satellites are widely used for environmental and oceanographic studies as well as for meteorology.

Communications

One of the most familiar uses of space technology in Australia is in telecommunications. Satellites now carry the majority of international telecommunications traffic from Australia, and television viewers are accustomed to 'live' transmissions of overseas sporting and news events. The first live international television broadcast in Australia was in November 1966, to the UK via the Carnarvon station of the Overseas Telecommunications Corporation (OTC).

OTC currently runs international gateway stations in Sydney, Melbourne, Ceduna and Perth, and also operates an important space installation in Gnangara, near Perth, for tracking and commanding telecommunications and scientific satellites. This work is done under contract to the international satellite communication groups INTELSAT and INMARSAT, and the European Space Agency; and on a collaborative basis with the National Space Development Agency of Japan and with Australian radioastronomers. The US National Aeronautics and Space Administration operates a similar station in Tidbinbilla near Canberra, to monitor and control unmanned NASA planetary missions, and to communicate with the Space Shuttle when it is orbiting above Australia.

Technologies and services developed in Australia are being exported by OTC to clients worldwide, with completed projects in Antarctica, Malta, Vietnam, Cambodia, Laos, and various Pacific Islands.

Growth in satellite telecommunications was so spectacular, and offered such great promise to a large, sparsely populated and remote country like ours, that the Australian Government decided in 1979 to create AUSSAT, one of the first national communications satellite systems in the world. AUSSAT Pty Ltd, a publicly-owned company, quickly established itself as an innovative deliverer of satellite

television, telephone and other services and has been responsible for greatly improved outback communications. The first and second in AUSSAT's initial series of three satellites were launched by the US Space Shuttle (27 August and 27 November 1985), and the third by the European Arianespace company on 16 September 1987.

The second series of satellite, known as AUSSAT B, will carry a special L-band channel for mobile communications, and will have a design life of about 13 years in orbit. The two satellites will be launched by the Chinese Great Wall Corporation, from Xichang in south-west China, on the Long March 2E rocket. The first launch, scheduled for March 8, was delayed by a rocket ignition fault, and will be re-scheduled for later this year. The second satellite is due to be launched in August or September. AUSSAT, as one of the first foreign customers for Chinese commercial launches, secured very favourable terms for the launch contract.

Over eight per cent of the components of the AUSSAT B series, in terms of cost, were supplied by Australian companies and CSIRO, under subcontracts to Hughes Aircraft Company of the USA.

A number of factors, not related to the technology itself nor to the high efficiency of AUSSAT Pty Ltd within its prescribed mandate, resulted in poor economic performance by the company. In December 1991 it was sold by the Australian Government to Optus Communications, a consortium of Australian, British and United States companies. At the same time, the Government announced a merger of OTC with Telecom, with the merged body AOTC to compete with the Optus group. The sale to Optus will not affect the AUSSAT B launch plans.

Earth observation

Images of earth taken by space satellites such as the US Landsat and the French/Belgian/Swedish SPOT are now widely used for environmental monitoring, as well as for mapping and resource exploration. Direct transmissions from these commercially operated satellites are collected on computer tapes at the Alice Springs ground station of the Australian Centre for Remote Sensing (part of the Commonwealth Department of

Administrative Services). The tapes are flown to the Centre's office in Canberra, where they are processed into photographs or computer compatible products, and distributed to customers. Images and computer tapes can also be purchased directly from representatives of the satellite operators, such as SPOT Imaging Services in Sydney.

Both Landsat and SPOT rely on camera-like instruments to measure visible and infra-red band radiation emitted or reflected from the earth's surface. Newer earth observation satellites, such as the European Space Agency's ERS-1 launched in July 1991 and the Japanese JERS-1 due to be launched in February 1992, carry powerful radar to 'illuminate' the earth below, regardless of darkness or cloud cover. They gather information about wave and ice conditions, as well as giving images of the 'roughness' of the land surface, which can be related to vegetation conditions, terrain, and soil moisture.

Signals from ERS-1 are already being received at the Alice Springs ground station, and data from JERS-1 will also be collected there. A new ground station is being built in Hobart to extend the range of earth observation satellite reception over the southern ocean. This is known as the Tasmanian Earth Resources Satellite Station, and is being funded by CSIRO, the University of Tasmania, the Commonwealth Department of Industry Technology and Commerce's Australian Space Office, the Bureau of Meteorology and the Australian Centre for Remote Sensing.

The European ERS-1 satellite carries a number of other instruments, including the Along Track Scanning Radiometer which is designed to precisely measure ocean temperature. Such measurements are important indicators of changing climate patterns. The Radiometer — conceived in part by Dr Ian Barton of CSIRO — was jointly made by the UK, France and Australia, the Australian component being manufactured in Adelaide by British Aerospace Australia with funding support from the Australian Space Office and CSIRO.

Earth observation satellites are an irreplaceable source of information about global resources and environmental change. The Australian Government's investment in ground equipment and research and development programs has

helped keep Australia at the forefront of earth observation applications and technology.

INTERNATIONAL SPACE YEAR

1992 is being celebrated as 'International Space Year' (ISY), following the suggestion of the late Senator Spark Matsunaga of Hawaii seven years ago. The ISY has been endorsed by numerous national governments and international organisations, including the UN General Assembly, the International Council of Scientific Unions, and the International Astronautical Federation.

1992 marks the 500th anniversary of the voyage of Christopher Columbus to the Americas, and the 35th anniversary of the International Geophysical Year which saw, in the launch of Sputnik 1 on 4 October 1957, the birth of the Space Age. The linking of these two past events with the International Space Year symbolises the spirit of discovery which is a driving force in exploration as well as in scientific research.

Many countries have set up public associations and scientific committees to promote the International Space Year. In Australia, the Academy of Science established a committee to improve the national coordination and planning of scientifically-oriented activities during the Year, while groups such as the National Space Society of Australia are planning special events to increase public awareness about space.

Senior officials from the world's leading space agencies and research institutions established the Space Agency Forum for the International Space Year to plan cooperative activities. Nearly 30 members and affiliates, including Australia's CSIRO, work together in this Forum. Its major aims are to demonstrate the practical and constructive benefits of space exploration, and to increase these benefits by encouraging international coordination in missions connected with Space Year.

The primary theme adopted by the Forum is 'Mission to Planet Earth', meaning the use of the vantage point of space to observe the earth, the only known home of life. Previous programs of planetary exploration have resulted in the creation of sensitive 'remote sensing' instruments and data handling systems. These are increasingly being applied to the discovery

and management of the earth's natural resources and to document changes in the natural environment due to human influence.

The Space Agency Forum is planning 10 individual projects under the Mission to Planet Earth theme, each under one or two 'lead agencies'. Australia, through CSIRO (with financial support from the Australian Space Office), is leading the Land Cover Change Project of International Space Year.

This project is designed to demonstrate the use of satellite information for observing and understanding vegetation change; and the connection between these changes, climatic influence, and human activities (including urban growth, forestry, and agriculture).

A team led by Dr Dean Graetz in CSIRO's Division of Wildlife and Ecology in Canberra is carrying out the Project, which will result in a video, CD-ROM record and book showing examples of significant land cover changes in various parts of Australia, as revealed by a twenty-year long series of satellite observations. Lengthy records like these are necessary to distinguish long-term change from that due to seasonal and other short-term climatic variation.

Australian researchers from CSIRO and several Universities will also join in other 'Mission to Planet Earth' projects during 1992, including global measurements of sea surface temperature using information from US, European and Japanese satellites; and studies of ocean productivity, based upon ocean colour measurements (indicating the concentration of phytoplankton, at the base of the marine food chain).

Australian space-based research commencing in 1992 includes investigations of ocean currents, underwater mountains, and wave heights, using information from the joint French/US

TOPEX-Poseidon radar altimeter satellite due to be launched from the Kourou Launch Centre in French Guiana, South America, around July. Other investigations include environmental, oceanographic, mapping and resource assessment studies based on information to be obtained from the Japanese Earth Resources Satellite, JERS-1, scheduled for launch from Tanegashima in southern Japan in February.

Other Australian activities marking International Space Year include a celebratory stamp issue by Australia Post and a commemorative \$5 coin from the Royal Australian Mint.

International Space Year represents a period of reassessment of space programs, both internationally and in Australia. Perhaps modern day space explorers can learn from the achievements as well as the mistakes of Christopher Columbus 500 years previously, using information from the frontiers of knowledge to help build a wiser, more prosperous, and more cosmopolitan world.

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 Mr William Barrett and Ms Jo Williams, OTC;
 Ms Keiko Crowley, SPOT Imaging Services;
 and Dr Dean Graetz, CSIRO Division of Wildlife and Ecology.

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