THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA
1974—Parliamentary Paper No. 273

House of Representatives Standing Committee On environment and Conservation

Report on

Deposits on Beverage Containers

Brought up and ordered to be printed 5 December 1974

THE GOVERNMENT PRINTER OF AUSTRALIA
CANBERRA: 1975

Printed by Austral Printing & Publishing Co., 125 Hawke Street, West Melbourne, Vic.

PERSONNEL OF THE COMMITTEE

Chairman	Dr H.A. Jenkins, M.P.
Members	Mr J.W. Bourchier, M.P.
	Mr J.C. Kerin, M.P.
	Mr A.H. Lamb, M.P.
	Mr P.F. Morris, M.P. [1]
	The Hon. I.L. Robinson, M.P.
	Mr I.B.C. Wilson, M.P. [2]
Clerk to the Committee ..	Mr B.M. Chapman

[1] Mr Morris replaced Mr R.H. Sherry, M.P. after the latter withdrew on 26 September 1974.

[2] Mr Wilson replaced Mr E.M.C. Fox, C.B.E., M.P. who was a member of the Committee in the Twenty-eighth Parliament.

... and Man created the plastic bag and the tin and aluminium can and the cellophane wrapper and the paper plate, and this was good because Man could then take his automobile and buy all his food in one place and He could save that which was good to eat in the refrigerator and throw away that which had no further use. And soon the earth was covered with plastic bags and aluminium cans and paper plates and disposable bottles and there was nowhere to sit down or walk, and Man shook his head and cried: 'Look at this Godawful mess'.

Art Buchwald.

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RECOMMENDATIONS

Definitions: for the purposes of these recommendations the Committee has adopted the following definitions of the terms 'beverage' and 'beverage container'.

beverage - beer and other malt ales, mineral waters, soda water and other carbonated soft drinks in liquid form and intended for human consumption.

beverage container - the individual, separate, sealed glass or metal bottle, can or jar which is designed to contain a beverage and has a capacity of less than 2 litres.

The Committee recommends:

1. That all beverage containers which do not carry a refundable deposit of at least 5 cents incur a tax of 3 cents payable once only at the point of manufacture or import of the container.

2. That the responsibility for the collection and disbursement of the recommended tax be with the Australian Government.

3. That metal containers for beverages having detachable parts be banned.

4. That the funds raised by the proposed tax on no-deposit containers should be made available for the following purposes:

(a) to enable local government and other authorities resposible for litter prevention and collection and waste disposal to carry out their responsibilities more effectively;

(b) to fund the establishment and continued operation of a unit within the Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O.) to investigate in co-operation with State Governments, local authorities and industry the recovery of resources from waste and the recycling of waste materials;

(c) to provide financial assistance to voluntary organisations involved in combating litter and encouraging the re-use of resources.

5. That, as far as is possible, manufacturers, retailers and fillers involved in the proposed system of re-use of beverage containers should involve the existing network of marine dealers.

GLOSSARY

In this Report the Committee has adopted the following definitions:

returnable container	- a container designed to be used more than once regardless of whether a refundable deposit is payable.
non-returnable (or 'throw-away') container	- a container designed to be used once only.
bottle	- a container made of glass.
can	- a container made of metal.

NOTE

In this Report:

(a) monetary values are expressed in the units of currency of the country under discussion unless otherwise indicated;

(b) metric and avoirdupois systems of measurement of weights and volumes are employed throughout the Report where such systems of measurement were used in the sources of information.

I INTRODUCTION

General

1. On 23 July 1974 on the motion of the Hon. Moss Cass M.P., Minister for the Environment and Conservation, the House of Representatives resolved -

> That a Standing Committee be appointed to inquire into and report on -
>
> (a) environmental aspects of legislative and administrative measures which ought to be taken in order to ensure the wise and effective management of the Australian environment and of Australia's natural resources, and
>
> (b) such other matters relating to the environment and conservation and the management of Australia's natural resources as are referred to it by -
>
> (i) the Minister for the Environment and Conservation, or
>
> (ii) resolution of the House.

2. The Committee succeeds the Standing Committee on Environment and Conservation of the Twenty-eighth Parliament which ceased to exist following the double dissolution of 10 April 1974.

3. The Committee would like formally to record its appreciation for the contribution made by both Mr E.M.C. Fox, M.B.E. and Mr R.H. Sherry to this Inquiry and to the work of the Committee generally. Mr Fox was a member of the Committee during the Twenty-eighth Parliament as was Mr Sherry who was reappointed in the Twenty-ninth Parliament and resigned on 26 September 1974. Mr Fox was replaced by Mr I.B.C. Wilson and Mr Sherry by Mr P.F. Morris.

4. On 9 August 1973 Dr Cass wrote to the Committee in the following terms -

'I understand that your Committee is proposing to undertake a general investigation of the problem of waste disposal in Australia. While commending the need for such a general investigation, there is one particular matter which, at the last meeting of the Australian Environment Council, all the States and the Commonwealth agreed was of an urgent nature, and it would be appreciated if you could give this priority attention so that some conclusion can be arrived at at the earliest possible date.

The Australian Environment Council passed a resolution in the

following terms:

> "Aware of the possible advantages of the implementation of a substantial minimum compulsory deposit system, the Australian Environment Council requests the Australian Government to conduct a Public Inquiry into the question of a uniform substantial deposit on all beer and soft drink and other beverage containers and means of implementing any such scheme, its economic, social and environmental effects and other positive alternative or supplementary course of action to solve the environmental problems presented by the disposal of these containers".

As the Australian Government representative on Council, I indicated that I would try to arrange for such an inquiry to be held. In view of your general interest in the problem and the powers available to your Committee, it would seem most appropriate that I should refer it to you'.

5. Subsequently, the Committee resolved on 10 August 1973 to conduct a public inquiry along the lines of the Australian Environment Council's proposal as soon as practicable.

6. The Committee had intended completing its Inquiry and presenting a final report during the middle of 1974. However, due to the double dissolution of Parliament this was not possible. To obviate the need to recall witnesses and readvertise for submissions to this and other Inquiries being conducted by the Committee, the Resolution of Appointment of the Committee in the Twenty-ninth Parliament empowered it to 'consider and make use of the evidence and records of the House of Representatives Standing Committee on Environment and Conservation appointed during the Twenty-eighth Parliament'. The Committee was therefore able to resume this Inquiry from the point where it was interrupted by the double dissolution.

Submissions

7. The Committee by public advertisement in the Press invited interested individuals to make formal submissions to the Committee on any aspect of its Inquiry. Ultimately, some 106 formal submissions were received in addition to large numbers of letters supporting a deposit scheme and a lesser number opposing it. The Committee also received a petition from several thousand Victorian school children supporting a system of deposits on beverage containers.

Technical Assistance

8. To consider the economic implications of a uniform deposit scheme and cost a number of possible alternatives to such a system, two technical advisers, Professor R.M. Parish and Dr R.R. Piggott, both of the Economic faculty at Monash University were appointed. Mr T.J.P. Richmond, Clerk to this Committee in the Twenty-eighth Parliament and on its reappointment in the Twenty-ninth Parliament, was appointed as a technical adviser to the Committee when he left the staff of the Department of the House of Representatives in September 1974.

Public Hearings and Inspections

9. The Committee has held public hearings on 13 occasions taking evidence from 56 individuals or representatives of organisations. The Committee also conducted inspections in Canberra, Port Kembla and Melbourne examining the manufacturing process of glass bottles, tinplate, steel and aluminium cans and the filling of beverage containers and their distribution. The Committee visited the steel can recycling plant and examined collection, storage and handling facilities of a marine dealer. Retail outlets for beverage containers were also inspected and the Committee studied the waste collection program in the Australian Capital Territory.

II THE NATURE OF THE INQUIRY

General

10. The Committee proposes to undertake an Inquiry into the problem of solid waste disposal in Australia. The problem of disposing of beverage containers has been seen by the Committee in the context of this proposed wider Inquiry.

11. Non-returnable beverage containers are symptomatic of the modern trend to throw-away packaging, which has caused a substantial increase in the volume of solid waste. The difficulty and the cost monetarily and environmentally of disposing of the waste generated by modern society have caused new methods of waste disposal to be evolved and have forced investigation into methods of decreasing the volume of solid waste.

12. A growing proportion of beverage containers are 'throw-away' or non-returnable. These products are conspicuous in litter and as such constitute a special disposal problem for municipal authorities charged with keeping our highways, shopping centres, streets and recreational areas free of visual pollution.

The Task of the Committee

13. The Committee's task was to consider the environmental, social or economic effects which could be expected from a deposit scheme on beverage containers or from any alternative system. The Committee then had to consider means of implementing the method or methods seen as most likely to be effective in solving the environmental problems presented by the disposal of beverage containers.

14. The evidence indicated that the areas which would be most influenced by any scheme to reduce the present environmental problems presented by beverage container disposal concerned litter, the use of non-renewable resources, waste disposal generally, the consumer and retailer and the manufacture of beverage containers and beverages. The Committee has attempted to assess the current situation in relation to each of these five broad categories and to assess the likely effects of various methods which might be implemented.

15. The methods considered, either as alternatives or supplements to a deposit scheme, include education campaigns against littering, stronger litter laws and more rigorous enforcement of them, the taxing

of non-returnable containers, grants or tax concessions for recycling operations and the banning of some forms of non-returnable containers.

16. The Committee has considered the systems operating in Norway, Sweden and Singapore, in the American States of Oregon and Vermont and in the Canadian provinces of British Colombia, Alberta and Saskatchewan.

The Nature of the Problem

17. The impetus for the Committee's Inquiry stems from the widely held belief that population growth combined with accelerating exploitation of exhaustible resources is leading to perceptible deterioration of the quality of the natural environment.

18. The process of production and consumption involves the chemical and physical change of matter but not its destruction. Except to the extent that re-use or recycling is possible production and consumption activities involve the conversion of productive inputs into an equivalent mass of non-productive residuals.

19. It is the consumption process rather than the production process which generates the need for residuals disposal.

20. The issue cannot be seen simply as one of, the polluters against the polluted. Until recently, the problem of disposal of residuals was not widely regarded as being serious. The environment was seen as capable of absorbing, transporting, dissipating or storing the product of man's production and consumption activity.

21. Up to a point the natural capacities of the environment absorb this activity without apparent deterioration. Beyond this point, a conflict emerges.

22. It is a conflict which arises between a demand for a clean environment and the production of commodities for consumption which involves the creation of wastes. Society's task becomes a process of reconciling the conflict between these alternatives.

23. Control of waste involves three basic methods: reduction in the volume and/or improvement in the quality or location of waste; improvement of the capacity of the environment to break down wastes; treatment of residuals after generation or application of protective measures at the point where damage is inflicted.

24. Our primary concern in this Inquiry is with the first of these methods, namely, the reduction in the volume of waste both at the

production and disposal stages. Any action recommended by the Committee would therefore be based on an assessment of the impact of the waste products on the environment and on the energy and raw materials used in the production process.

25. Regulation of the quantity and nature of waste generated by beverage containers could be influenced directly by action initiated by the Government at the production stage through taxation measures, at the consumer level by influencing consumer behaviour through adjustment of prices and/or by a deposit scheme. The collection and disposal of waste could be affected by government grants or financial incentives for this purpose, or by imparting to the container a monetary value which would reduce the incidence of littered containers and ensure their voluntary collection for profit.

III PACKAGING AND THE CONSUMER

The Present Situation

26. The basic trend in the packaging industry is towards the introduction of disposable packages for all goods. The concern expressed in recent years about the effects of this trend on litter and visual pollution and the wastage of resources involved is by no means confined to beverage containers. However, the latter symbolise for many people the wasteful and despoiling aspects of our consumption-oriented society.

27. Soft drinks, beer and milk are increasingly being sold in throw-away containers. Many people can remember these products being sold only in returnable glass containers and believe such a system could work successfully again.

28. Milk, for example, has traditionally been delivered to people's houses in returnable glass bottles. In many areas plastic containers and cardboard-coated cartons are being introduced to replace the bottle. The Committee was told that the reason for this is that it is in the interests of the consumer. Whilst it may be true that there is some saving in delivery and collection costs to the milk vendor, the direct benefit to the customer is not clear. What is obvious is that the community pays a higher price for the container and incurs additional costs both in terms of disposal and of the resources required to manufacture a throw-away container compared with one which may be re-used.

29. Many of those associated directly with the beverage industry and particularly the container manufacturers believe that their products represent a small proportion of total solid waste and that their activities are being unjustly singled out for special attention. However, beverage containers form a growing proportion of solid waste and present special disposal problems in not being biodegradable. Beer and soft drink cans are also conspicuous in roadside litter and although paper constitutes the largest category of litter by item count, this includes, for example, bus tickets and other relatively inconspicuous items. It is felt by many people to be crucial that our society decide now whether it is desirable, or even possible in the long term to permit the continued expansion of the 'throw-away ethic'.

30. Consumers usually have the choice between a returnable and a non-returnable container but already some retail outlets are refusing to

handle returnable containers. If present trends continue the expression of consumer preference may well become impossible within the next few years.

Some Alternatives to the 'Throw-away Ethic'

31. A returnable bottle scheme with or without deposits can and has worked in the past for milk, beer and soft drinks. Such a system depends on the existence of an infrastructure which provides the facilities to collect, store, wash and return bottles to fillers. The Committee was informed that there has been a decrease in the number of professional bottle collectors and the remainder are concerned at the trend by fillers towards the use of non-returnable containers.

32. A number of small local or regionally-owned fillers with limited transport costs favoured the returnable bottle but were opposed in their view by the large nationally organised companies. The Committee was told that large nationally known brands have subsidised the introduction of one-way bottles and cans into country areas at the expense of regional fillers.

33. The marine dealers or professional bottle collectors are a group who support the maintenance of a return scheme. While visiting a large bottle collection yard, the Committee was interested to see thousands of bottles with the imprint 'not to be re-used' being washed for resale to fillers at well under the new bottle price.

34. The net price of a returnable container and its contents are significantly cheaper to the consumer than a non-returnable container with the same volume of beverage.

35. Glass manufacturers are competing with the can makers for the non-returnable market by producing non-returnable bottles in place of the traditional returnable bottle. This is participating in the throw-away psychology. The motive appears to be that although glass can be re-used satisfactorily recycling rather than re-use increases sales volumes and maintains or increases the market share.

36. The natural resources which go into the manufacture of bottles and cans, plastic and cardboard containers are not inexhaustible nor is the energy which is needed in order to convert the raw material or recycled material into the finished product. This aspect is discussed in Chapter VI of this Report.

37. The advocates of a deposit scheme argue that it would solve a major part of the visible litter problem. The scheme is seen as being equitable because the litterer in effect pays a penalty by forfeiting the deposit. The container component of litter would have value thus providing an incentive for others to pick up waste beverage containers left by litterers. They argue that the returnable container deposit system has worked well in the past, can work again and should result in cheaper beverages for consumers.

38. A deposit scheme would serve a useful purpose in reducing the volume of solid waste for disposal which is rapidly becoming a major problem particularly in urban areas. Deposits would provide, it is said, a symbolic victory for the planned conservation of resources over their profligate consumption. This ideal is opposed to the assumption that resources will last forever or that technology will solve future problems.

39. The Packaging Industry Environment Council (P.I.E.C.) claimed in evidence that only about 1 percent of solid waste in Australia was misplaced as litter and of that 1 percent only about 10 percent would be covered by a deposit system.

40. Liquor merchants, hoteliers and some other retailers argue that their businesses operate on the assumption that containers once sold are not their responsibility and that facilities for returned containers and handling problems would add very greatly to their costs.

41. The packaging industry argued that a deposit scheme would have a serious and adverse effect on the Australian Government's tax revenue by reducing the total volume of containers being produced.

42. Industry representatives believe that a deposit scheme would have an adverse effect on employment in their industry through the reduction of sales volume. However, high labour turnover in this industry may cushion this effect.

43. Those opposed to a deposit scheme as an answer to the litter problem emphasise the need to recognise litter as being a 'people problem' involving a small minority of irresponsible persons. They believe that rigid enforcement of anti-litter laws combined with education programs and the provision of litter bins can solve the problem posed by beverage containers as a component of litter.

44. Arguments were advanced that the resources needed to wash and process returnable bottles are a drain on resources in the same way as

the manufacture of new containers. It was stated that storage of empty containers introduces a risk of disease and infection and that employees would be unwilling to become involved in the 'distasteful' business of sorting and stacking bottles, cans and cartons.

Consumer Choice

45. The packaging industry argue that they cater to the demands of the consumers. The rapidly rising rate of growth of the disposable container sector of the beer and soft drink markets in relation to total sales indicates they have some reason for this view. It can, however, be argued that in reality the consumer has not been provided with a real choice and that these disposable products are very heavily promoted.

46. The manufacturers and fillers justify their actions on the ground that they are catering for the wants of the consumer. This raises philosophical questions as to whether the consumer gets what he wants or what he is told he wants. In large supermarket chain stores, the consumer's choice is becoming increasingly limited to non-returnable container items.

47. Witnesses favouring a non-returnable scheme were unable to justify their view of consumer wishes being the reason for the introduction of a non-returnable product. There was a strong inference that Australian manufacturers adopted non-returnable containers because they had been successful in America. There was no evidence that a survey of consumer wishes was carried out prior to the introduction of non-returnable containers.

48. Solid waste pollution, and the non-returnable beverage container in particular, poses moral questions about advertising and consumer choice in addition to the practical problems of disposal, littering and resource wastage.

49. At present - and assuming present trends continue, this situation is likely to become more marked - vast numbers of bottles, cans, plastic and cardboard containers are being crushed, buried, burned and littered. Collection and disposal are in themselves major problems with an estimated 3,491.2 million beverage containers being filled in Australia in 1972-73. This figure does not include plastic beverage containers or milk cartons. The containers being disposed of represent finite resources which it has been argued should be re-used or, at the very least, recycled.

The Confrontation

50. The issues largely polarise into two conflicting attitudes.

51. One attitude is that the rights of consumers are paramount, that the nation's resources are unlimited and that a manufacturer's responsibility for his product ends at the point of sale.

52. The other extreme is the view that resources are finite, should not be needlessly wasted and that manufacturers have a responsibility for their products. A financial inducement is seen as the most realistic way to both avoid littering of beverage containers and ensure that even if littered, they will not remain as litter because of their salvage value.

IV SOLID WASTE DISPOSAL

Quantity

53. The Committee was told that throughout Australia some 5 million tonnes of solid waste are disposed of annually or 1 kilogram of solid waste per person per day. Solid waste includes household garbage and industrial waste, mineral spoils, animal wastes and agricultural wastes. The Metropolitan Waste Disposal Authority (N.S.W.) estimates that 46 percent of the waste stream is derived from domestic sources.

54. By the year 2000 there will be a significant increase in waste generation per head of population. Population growth together with increasing per capita generation of refuse emphasises the need for more efficient and effective methods of waste disposal.

55. The Committee was told that a typical break-down of garbage by volume would be:

	%
Paper	37.0
Vegetables	33.0
Glass	14.0
Cans	7.0
Earth and Ashes	4.2
Timber and Waste	3.0
Plastics	1.8
	100.0

56. The above figures indicate that glass and cans account for some 21 percent of total municipal garbage with beverage containers making up a large proportion.

57. In its report on Community Solid Waste Practices in Australia, Australian Consolidated Industries Limited (A.C.I.) prepared the following table of the generation of domestic and municipal refuse in metropolitan areas.

GENERATION OF DOMESTIC AND MUNICIPAL REFUSE IN METROPOLITAN AREAS

In Kg. Per Person Per Day - Calculated and Assumed Values:

	1971	1975	1980	1985	1990	1995	2000
Sydney	1.190	1.320	1.540	1.850	2.270	2.830	3.550
Melbourne	1.010	1.150	1.435	1.795	2.245	2.815	3.550
Brisbane	0.960	1.065	1.270	1.540	1.890	2.320	2.870
Perth	1.085	1.180	1.370	1.620	1.980	2.240	3.000
Adelaide	0.835	0.950	1.175	1.460	1.800	2.200	2.750
Hobart	0.818	0.920	1.090	1.300	1.580	1.980	2.500
Canberra	0.700	0.780	0.900	1.080	1.350	1.750	2.300
Darwin	0.700	0.780	0.900	1.080	1.350	1.750	2.300

58. Based on the above per capita generation figures, the total quantities of domestic and municipal wastes have been calculated as follows (expressed in metric tonnes per year):

	1971	1975	1980	1990	2000
Sydney	1,269,000	1,479,000	1,892,000	3,466,000	6,358,000
Melbourne	921,000	1,202,000	1,672,000	3,236,000	6,164,000
Brisbane	339,000	412,000	559,000	1,041,000	1,975,000
Perth	278,000	348,000	490,000	950,000	1,799,000
Adelaide	257,000	329,000	465,000	934,000	1,784,000
Canberra	36,000	57,000	86,000	201,000	460,000
Hobart	46,000	59,000	81,000	150,000	272,000
Darwin	9,500	15,000	22,000	58,000	151,000

Waste Disposal Methods

59. Most residential waste disposal is carried out by municipal authorities while disposal of industrial waste is shared between municipal authorities and private companies.

60. The major methods of disposal are:

(i) Open dumping;
(ii) Controlled tipping;
(iii) Sanitary landfill;
(iv) Incineration;
(v) Pulverisation;
(vi) Composting;
(vii) Compacting.

61. (i) Open Dumping: Waste is deposited in open spaces with no subsequent care or treatment. These may take the form of 'tips' and may include dumping in the ocean, on disused land sites, exhausted quarries, gullies or other natural features. Besides being unsightly, open dumps may constitute health hazards through polluting the ocean or from rain water run-off.

62. (ii) Controlled Tipping: Refuse is deposited in an area and systematically covered with a layer of soil or other non-pollutant material. This system reduces infestation by insects or vermin and prevents air pollution.

63. (iii) Sanitary Landfill: Sanitary landfill is a more expensive alternative to dumping. It involves depositing refuse in trenches or on surfaces. The refuse is then spread and compacted with heavy equipment and is covered each day with 15 cm to 30 cm of soil. The completed operation is then sealed with 0.6 m to 1.0 m of soil.

64. Land used for this method of disposal may later be utilised as park land or for recreational purposes. In spite of the substantial initial capital investment required, operating costs are relatively low and this is considered a desirable method of disposal.

65. (iv) Incineration: Rubbish is burnt in an incinerator. Temperatures of 850^{o} to 1,000^{o}C can effectively reduce the volume of refuse by 80 percent or more while converting organic material into an inert gas.

66. Sorting and incineration can provide municipalities with an effective means of pre-processing solid waste, rendering it a good medium for landfill. Transportation costs may be reduced because of reduction of the volume of waste and the capacity of landfill sites increased. Incineration reduces the noxious characteristics of the refuse.

67. Although expensive to operate, a major advantage of this method is that the separated bi-products may possibly be sold to recover operating costs and the heat from incineration is marketable. Ash may be used as a raw material in the manufacture of cement and other products.

68. Often partial incineration is achieved producing a residue containing unburnt organics which can cause air pollution. Consequently, costly anti-pollutant devices must be used in conjunction with the incineration process.

69. (v) Pulverisation: Crude refuse is crushed or pulverised resulting in a considerable reduction in volume but little reduction in weight. This process produces a hygienic material which is unattractive to vermin and virtually free of offensive odours.

70. Where pulverised refuse is deposited as sanitary landfill it does not require a daily cover and further compacting and consolidation processes may be carried out.

71. (vi) Composting: Organic refuse is reduced to inert humus material through biological decomposition, either by a natural rotting process or through an accelerated reaction in fermentation units under controlled conditions.

72. Composting serves as a soil conditioner and as sanitary landfill reduces the volume of solid waste. Non-compostible elements must be removed from the refuse by mechanical or magnetic means to make the process effective. The growth of packaging as a component of refuse will result in the growth of paper, glass and metal thus reducing the suitability of this type of disposal.

73. (vii) Compacting: This is another volume reduction method that reduces transport costs, prolongs the life of landfill sites and may increase the standard of hygiene in collection and disposal of waste.

Attitudes of Local Authorities

74. Because waste disposal is largely a responsibility of municipal authorities, the Committee heard evidence from a number of city councils in order to gain an understanding of their problems.

75. The Committee was told that surveys carried out on waste disposal methods in Australia indicate that nearly all is disposed of by dumping and landfill, with 90 percent of solid waste being disposed of at conventional landfill sites.

76. Municipalities estimate that by the year 2000 they will have to dispose of six times as much refuse as at present. Councils told the Committee that over the last 15 years there has been a considerable change in the volume of various kinds of garbage with an increase in paper, glass and can components.

77. The major problem faced by local councils is the high and increasing costs associated with waste disposal. The changing nature of the composition of solid waste means that councils are experiencing

difficulties in coping with the greater strains being placed on their collection and disposal facilities. The A.C.I. report included the following estimates of waste handling costs:

	Annual Total 1972			
Metropolitan Areas	$	$/pers	$/$m^3$	$/tonne
Sydney Region (S.S.D., O.S.S.D.)	19,100,000	6.53	4.46	20.08
Melbourne (M.S.D.)	10,250,000	3.97	3.06	13.75
Brisbane Region (B.S.D., M.S.D.)	3,170,000	4.53	3.72	16.80
Perth (P.S.D.)	3,217,000	4.58	3.14	14.12
Adelaide (A.S.D.)	2,000,000	3.47	2.81	12.63
Canberra (C.S.D.)	1,035,000	6.77	4.47	20.10
Hobart (H.S.D.)	595,000	3.89	4.60	20.70
Darwin	No cost figures available			

The waste handling costs have been computed and extrapolated from figures provided by communities covered in the field survey. They also include the annual capital costs for plants and facilities.

Provincial Areas

Only communities with populations over 10,000 have been covered by the field survey.

Generation Figures for domestic and municipal wastes and costs have been calculated from the information provided by the communities.

	Daily 'per-capita' Generation in kg/person/day	$/ person/year	$/$m^3$	$/tonne
Victoria	0.640	2.82	3.52	15.82
New South Wales	0.940	4.40	3.77	16.95
Queensland	0.815	2.98	1.97	8.86
Western Australia	0.920	4.36	1.73	7.78
South Australia	0.580	3.64	2.83	12.75
Tasmania	0.630	2.71	2.62	11.79

78. The growth of the throw-away no-deposit beverage container has brought considerable problems for local government authorities. councils stated that the increase in volume of waste has substantially increased disposal expenditure. The Committee was told that the deposit-bearing bottle is an insignificant component in the rubbish collected by councils but that cans and non-returnable bottles have aggravated disposal problems as well as occupying valuable tip space.

79. The space being taken up by the increased volume of waste has aggravated problems regarding the lack of suitable landfill sites and growing transportation costs. The dwindling supply of sites within reasonable distances from the sources of waste have added to problems faced by councils.

80. The Victorian State Development Committee on Disposal and/or Destruction of Garbage and Other Rubbish reported: [1]

> 'The question as to what is the estimated life of present and potential disposal sites is dependent upon many factors, some of which cannot be reliably estimated; but, on the basis of the estimates furnished by the respective municipalities, it is likely that within the next decade, sanitary landfill sites will be exhausted within another seven municipalities, thus making a total of at least twenty-two councils in the metropolitan area without sanitary landfill sites by the year 1980'.

81. The Report went on to say:

> 'After weighing all the evidence, the Committee finds it impossible to escape the conclusion that serious refuse disposal problems are even now emerging within the metropolitan area, which unless recognised and remedied, could lead to chaotic conditions developing within the next decade, with regard to the disposal of refuse generated within the rapidly growing metropolis'. [2]

82. In addition, where councils experience shortages of land for development, there may exist a conflict between alternative land uses. In such cases, councils set their priorities and try to achieve a balance between their waste disposal needs and needs for other purposes.

83. Another major disposal problem faced by councils is the lack of recycling or waste retrieval facilities at disposal depots. Councils are forced to bear the cost of disposal of all of the solid waste. Most councils appearing before the Committee stated their willingness to arrange for the collection of cans if manufacturers could develop methods for recycling.

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[1] Progress Report of the State Development Committee on the Disposal and/or Destruction of Garbage and other Rubbish, Victoria, 1971, p.28.

[2] Op. Cit. p.29

84. Councils believe that manufacturers should contribute towards improved waste disposal by developing ways of reducing the volume of waste for disposal and utilising the waste as raw material for other purposes.

85. Councils have experienced difficulties in the collection and disposal of bottles (mainly beer bottles) and the Council of the Municipality of Mosman spends over $21,000 annually on the collection and removal of bottles in a municipality of 30,000 people.

86. Incineration appears to be the most successful method used by local authorities to dispose of waste although its introduction is recent and limited. In N.S.W. the municipalities of Waverley and Woollahra have combined in Sydney's first high-temperature refuse destructor serving five councils at a cost of $5 million. Other modern incinerators are located in Waterloo (N.S.W.), Toowoomba (Qld) and Port Melbourne (Vic). The last of these was designed for the destruction of quarantine garbage and port refuse from overseas vessels.

87. Only recently, councils and governments have become aware of the magnitude of the problems of solid waste management and the effort needed to find solutions.

88. Councils believe that lack of finance is the major obstacle in their bottle to cope with waste disposal. Although improved technology may help in the long run, councils feel that their short-term interests would be better served by a greater allocation of funds.

89. It was suggested to the Committee that a tax be imposed on the manufacture of all beverage containers. The taxation revenue was to be distributed to councils to meet the costs associated with the disposal of the beverage container component of solid waste.

Resource Recovery

90. The Committee was interested to learn of a process developed in the U.S.A. which is aimed at recovery of usable energy and marketable resources from municipal solid waste.

91. The originators of the process recognised that recycling efforts were insignificant when compared with the enormity of the waste disposal problem. Dwindling supplies of energy and natural resources led to the realisation that a valuable source of raw materials and energy could be recovered by processing waste that would be lost in the disposal process.

92. The aim is to retrieve paper, plastics, aluminium and other non-ferrous metals and ferrous metals from the waste stream by subjecting raw refuse to shredding, air classification, magnetic separation, vibrating, filtering, purifying and compacting. The developers of the scheme claim that up to 80 percent (by weight) of municipal waste is recyclable. They point out that for a community with scarce landfill sites and high transportation costs the system may be successfully implemented although in remote areas with plentiful sites sanitary landfill would probably be the most economical method of waste disposal.

93. The following chart shows possible methods by which various items of solid waste may be separated, used and marketed:

Recoverable Item	Method of Separation	Possible Use	Market
Light paper, fibre, plastics and miscellaneous combustibles.	Air classification.	Fuel.	Power utilities cement manufacturers.
Shredded cans, appliances and ferrous metals.	Magnetic separation.	Scrap steel.	Steel mills, copper mines.
Newspaper and corrugated cardboard.	Manual.	Paper manufacture, newsprint.	Paper mills.
Aluminium.	Electromagnetic separation.	Aluminium manufacture.	Smelters and aluminium foundries.
Aggregate (shattered glass, stones, ceramic pieces).	Vibrating screen and purification processes.	Cement and road making.	Cement manufacturers.

94. The system is a recent innovation in the U.S.A. and an overall assessment of its usefulness has yet to be made. Technology in Australia is not sufficiently advanced to permit its large scale introduction and the costs associated with the operation are exceedingly high. For these reasons the Committee does not see this system of waste disposal as an answer to Australia's problems.

95. However, the Committee recognises that such a scheme represents a significant development in waste disposal techniques and is one that in the long-term could possibly be applied in Australia with beneficial results.

Cost to the Community

96. The Committee was told that the cost of collection and disposal of domestic solid waste is approximately $5 per ton and $19 per ton for total solid waste. These costs are expected to rise by 25 percent in the next few years. The claim was made that the elimination of all beverage containers would result in savings in disposal costs in New South Wales alone of about $350,000 and would lead to some reduction in the bulk of waste for disposal and a consequent reduction in the landfill requirement.

97. The A.C.I. report estimated costs of waste disposal as follows:

(i) Composting:
$4.00 - $8.00 per tonne capacity 20,000 tonnes p.a.
$2.00 - $3.00 where there is a ready market for the compost.
Initial investment required - $500,000 to $750,000 for population of 75,000 to 100,000.

(ii) Pulverisation:
Capital investment ranges from $150,000 to $400,000; running costs $50.000 p.a. to $120,000 and unit processing cost could vary between $1.25 and $4.50 per tonne.

(iii) Incineration:
Waverley-Woollahra cost $5.2 million disposal charge $6.94 per tonne of refuse incinerated.
Normal capital investment: $8,000 per tonne installed daily capacity on large schemes and $17,300 per tonne for smaller units. Incineration costs may vary from $3.00 per tonne for larger plants with waste heat recovery to $10.00 per tonne for small plants without heat recovery.

98. The survey emphasises that between 11 percent and 23 percent of the total amounts spent for waste handling are allocated to disposal activities.

99. The evidence shows that increasing use of throw-away beverage containers has contributed towards the greatly increased costs incurred by municipal authorities in the disposal of solid waste.

100. It is gnerally recognised by local authorities that growing volumes of solid waste are being generated in the community and that disposal problems are proving more formidable as landfill sites become scarcer.

101. Research is currently being undertaken in the field of solid waste management in an attempt to conserve Australia's raw materials. Until such time as an economical method can be found of utilising a greater proportion of solid waste, efforts must be directed towards curbing the rate of growth of solid waste, improving current methods of its disposal and reducing associated costs.

102. Discouraging the use of throw-away no-deposit beverage containers would clearly be of benefit. As returnable deposit-bearing bottles account for only a very small proportion of the glass component of municipal waste, it is clear that the deposit serves as an effective method of reducing the number of such containers in the main stream of solid waste.

103. It follows that a deposit scheme could be expected to have a similar effect on other types of beverage containers and would make a significant contribution to waste disposal and environmental protection.

104. There are costs associated with such a scheme, notably those relating to handling and storage.

105. An alternative course of action aimed at discouraging the use of throw-away beverage containers would be to impose a tax on them and distribute the proceeds to local governments as discussed in paragraph 89 above.

V LITTER

General

106. Litter is composed of articles which most people would regard as worthless and which have been discarded in public places. The presence of litter appears to encourage people to add their own valueless articles to the existing accumulation so that parks, beaches, streets, shopping centres and roadsides become increasingly unsightly. This requires local government authorities to spend a large proportion of their finances on a continuous litter clean-up. The development of modern packaging, for hygiene, transportation, convenience and other reasons, has led to a vast increase in the amount of material designed to be discarded. This convenience packaging forms a large part of the solid waste stream and constitutes formidable disposal problems and inconvenience for municipal authorities.

Volume and Cost of Collecting Litter

107. As stated in paragraph 29 the P.I.E.C. informed the Committee that litter forms only about 1 percent of solid waste. This estimate was supported by the Plastics Institute of Australia Incorporated, Comalco Limited and Alcoa of Australia Limited although so far as the Committee has been able to ascertain, this 1 percent estimate is based solely on the statement by the P.I.E.C. that this is the figure 'accepted overseas'. If Australians discarded as litter only 1 percent of the solid waste they generate, this would amount to approximately 50,000 tonnes of litter per year. It costs considerably more per kilo to collect and dispose of litter than of solid waste. However, authorities responsible for the collection of litter have given evidence to the Committee that makes it seem likely that considerably more than 1 percent of the solid waste stream is discarded as litter.

108. The Country Roads Board of Victoria carried out a State-wide survey in 1971 to determine the amount of money and manpower expended on the collection and disposal of rubbish from roads under the Board's control. The survey showed that in the previous twelve-month period, approximately 12.5 percent of the working time of patrolmen responsible for the maintenance of roads was devoted to the removal of an estimated 33,000 tonnes of litter from roadsides, excluding litter placed in litter bins.

109. The Board reported that litter was most numerous in the more heavily trafficked arterial highways. A three-man patrol is employed almost continuously in collecting litter on the sixty mile section of the Hume Highway between Seymour and Benalla. The annual cost of clearing this section of road is $18,000. In a survey conducted in June 1972, the Country Roads Board of Victoria requested maintenance unit personnel to estimate for each section of road the number of man-days spent on the collection of litter (excluding that placed in litter bins) during a twelve-month period. It was estimated that over 6,000 man-days per year were spent in collecting litter. The Board estimates that it spends more than $250,000 per year in removing litter from the 5,600 miles of roads under its direct control. In addition, there are 9,000 miles of declared roads and 15,000 miles of unclassified roads under the control of municipal councils, which are also charged with the task of removing litter. In November 1971, the Minister for Local Government stated that the total cost of removing litter from roads in Victoria exceeded $1 million a year. The cost of clearing parks and other recreation areas must be added to this figure.

110. The Committee heard in evidence that the cost of collecting litter is related to the number of items picked up rather than to its volume. It appears to cost a similar amount to pick up a drink tag, container or exhaust pipe. The Committee was told that in the U.S.A. the cost of picking up litter has been assessed at up to 35 cents per item. In Queensland the cost of picking up litter has been assessed at 8 to 10 cents per item. This is based on the wages of a litter collector and the maintenance and use of a vehicle, on the assumption that the collector is travelling 70 percent of his time and collecting litter 30 percent of his time.

Beverage Container Component of Litter

111. Evidence from industry groups concerned with the manufacture and retailing of beverage containers maintained that these constitute 20 percent of litter. This figure was based on the survey of roadside litter carried out by the Keep America Beautiful Council in 1968-69.

112. The Country Roads Board of Victoria claimed that drink containers - cans and bottles - constitute 10 percent of litter on the roads under their jurisdiction. On the Princes Highway between Melbourne and Geelong an average of 300 discarded drink containers per

mile are collected each week. The Board estimated that the cost to them of collecting and disposing of cans and bottles is $23,000 a year. It seems possible that in beaches and picnic areas the proportion of litter consisting of cans and bottles would be higher than on roadsides.

113. The estimated number of beverage containers littered in 1972-73 was 91.1 million bottles and cans or 2.6 percent of the 3,491.2 million bottles and cans filled in Australia. This was divided between 'deposit' and 'non-deposit' containers as follows:

Estimated Rate of Beverage Container Littering 1972-73

	No. of fillings (millions)	Proportion Littered (%)	No. Littered (millions)
Non-deposit Containers			
Refillable beer bottles	840.3	0.4	3.4
Non-refillable beer bottles	44.2	4.7	2.1
Soft drink bottles	201.7	1.2	2.4
Total Bottles	1086.2	0.7	7.9
Cans	1262.2	5.9	74.1
Total Non-deposit Containers	2348.4	3.5	82.0
Deposit Containers (Soft drink bottles)	1142.8	0.8	9.1
Total bottles and cans (Deposit and Non-deposit)	3491.2	2.6	91.1

114. Thus, 3.5 percent of 'non-deposit' drink containers filled were littered as opposed to 0.8 percent of drink containers filled that were carrying a deposit.

Litter Surveys

115. Documented and reported litter surveys made available to the Committee were confined to studies of roadside litter. Conclusions drawn from these surveys are not necessarily relevant to the nature and composition of litter in shopping cnetres, parks, on beaches and in other recreational areas. Moreover, many of the studies of roadside litter are not comparable with each other because of such factors as differing classification methods, differing types of areas covered and insufficient control of the variables involved.

116. In the U.S.A. the most substantial study of roadside litter is the 'National Study of Roadside Litter' carried out for Keep America Beautiful Inc. by the Highway Research Board in 1968-69. The Research Triangle Institute which summarised the report pointed out that the survey was not comprehensive even in terms of roadside litter, being limited to interstate and primary highways only. Secondary highways, local roads and city streets were not included. No attempt was made to standardise the definition of litter in each of the 29 participating States. The proportion of drink containers among littered items could be expected to vary according to the season, being greater in summer than in autumn and winter when the survey was carried out.

117. The survey reported the following findings:

Composition of Litter (Percent of Items)

	KEEP AMERICA BEAUTIFUL	
	1st PICKUP	2nd PICKUP
	%	%
1. CANS		
(a) Beer	21.7	11.7
(b) Soft Drink	4.4	3.1
Total Beer and Soft Drink	26.1	14.8
(c) Food and Other	2.3	1.4
Total Cans	28.4	16.2
2. BOTTLES AND JARS		
(a) Returnable		
- Beer	0.4	0.4
- Soft Drink	1.6	1.6
Total Returnable	2.0	2.0
(b) Non-Returnable		
- Beer	2.7	2.3
- Soft Drink	0.8	0.5
Total Non-Returnable	3.5	2.8
Total Beer and Soft Drink	5.5	4.8
(c) Other	1.4	1.1
Total Bottles and jars	6.9	5.9
3. PAPER TOTAL	48.9	59.5
4. OTHER	15.9	18.3
TOTAL	100.0	100.0
OF WHICH:		
- Beer and Soft Drink Containers	31.6	19.6

118. In July 1971 the Croydon Apex Club conducted a roadside litter survey for the Keep Australia Beautiful Council (Victoria). This was limited to two separate miles of road in the City of Croydon, 20 miles east of Melbourne. One mile was on a domestic and local access road and the other on a through traffic highway to the Dandenong Ranges. All items were picked up, classified and counted and the findings were sent to the University of Melbourne's Institute of Applied Economic and Social Research for statistical analysis. Their analysis for the July 1971 Croydon survey was reported as:

NUMBER OF LITTER ITEMS PER MILE

Description of Items	Domestic Access Mile Items	%	Through Traffic Mile Items	%	Average Items	%
Paper packages, material or containers	640	32.5	1,874	27.4	1,257	28.5
Other paper items	496	25.2	2,401	35.0	1,448	32.8
Newspapers or magazines (or part)	193	9.8	686	10.0	440	10.0
Total number of paper items	1,329	67.5	4,961	72.4	3,145	71.3
Beer cans	18	.9	311	4.6	165	3.8
Soft drink cans	81	4.1	283	4.1	182	4.1
Food cans	2	.1	14	.2	8	.2
Other cans	7	.4	42	.6	24	.5
Total number of cans	108	5.5	650	9.5	379	8.6
Plastic packages or containers	39	2.0	63	.9	51	1.2
Other plastic items	47	2.4	86	1.3	67	1.5
Total Plastic items	86	4.4	149	2.2	118	2.7
Auto parts and accessories	6	.3	17	.2	12	.2
Tyres or tyre pieces	-		-		-	
Timber or construction	53	2.7	30	.4	41	.9
Unclassified	30	1.5	108	1.6	69	1.6
Small metal	97	4.9	157	2.3	127	2.9
Total miscellaneous	186	9.4	312	4.5	249	5.6
Returnable beer bottles	2	.1	20	.3	11	.3
Non-Returnable beer bottles	-		15	.2	8	.2
Returnable soft drink bottles	-		8	.1	4	.1
Non-Returnable soft drink bottles	-		-		-	
Wine or liqueur bottles	-		3	.1	1	
Food bottles or jars	1	.1	18	.3	10	.2
Other bottles or jars	-		2		1	
Total bottles and jars	3	.2	66	1.0	35	.8
Small material pieces, unclassified ceramic and glass	256	13.0	713	10.4	484	11.0
Total of items	1,968	100.0	6,851	100.0	4,410	100.0
Volume of Litter	16 cu. ft.		81 cu. ft.		48 cu. ft.	

119. The Keep Australia Beautiful Council claimed that the survey shows that returnable beer and soft drink bottles outnumbered non-returnable bottles by almost two to one and hence the Council queries that placing deposits on non-returnable drink containers would have a deterrent effect on litterers. The Council also has claimed that the survey shows that deposit bottles were more prevalent than no-deposit bottles.

120. The Council's interpretation of the survey does not necessarily follow from the figures provided because of its confusion between the terms 'returnable' and 'deposit'. The two-to-one ratio appears to have been arrived at by adding in the returnable beer bottles and returnable soft drink bottles shown in the 'Average' column as against non-returnable soft drink bottles. Beer bottles, though returnable, do not carry a deposit so that the figures in the 'Average' column should be interpreted as nineteen no-deposit bottles being found as against four deposit-bearing bottles. Beverage cans have been ignored in that section of the survey dealing with returnable and non-returnable containers.

121. The Croydon Apex Club conducted a follow-up survey for the Keep Australia Beautiful Council in July 1973. The same areas were covered and statistical analysis was again provided by the Institute of Applied Economic and Social Research at the University of Melbourne. Over the two miles the litter averaged out in the following compositions:

LITTERCOUNT SURVEY

	1971	1973
Paper Items	71%	70.8%
Cans	9%	18.5%
Plastic Items	3%	1.8%
Bottles and Jars	1%	0.5%
Miscellaneous (car parts, tyres, timber, etc.)	6%	8.4%
Unclassified items of small pieces of materials	11%	-

122. Keep South Australia Beautiful (Inc.) co-ordinated a litter survey by eleven community service clubs on roads in and around Adelaide in October 1973. Each survey group collected all litter over measured miles and counted it into categories. The results were assess by Adamson Penhall and Company, Chartered Accountants. The survey showed:

	%	%
Paper (Including paper drink containers)		61.0
Bottles/Jars		
No-deposit beverage containers	2.2 *	
Deposit bearing soft drink bottles	0.4	
Other	0.2	
Total		2.8
Cans		
Beverage containers	9.7	
Other	0.5	
Total		10.2
Plastic (Including drink containers and cups)		8.7
Miscellaneous and Other		17.3
	Total ...	100.0

123. According to this survey, beverage containers comprised 12.3 percent of litter collected. Deposit-bearing beverage containers comprised 0.4 percent of total litter.

124. Measuring litter on a unit basis would tend to overstate the contribution of many small items such as pieces of paper. The use of volume rather than units as a measure of litter would increase the apparent contribution of beverage containers. Measurement on a unit basis takes no account of the visual impact of various littered items. Drink containers, particularly cans, tend to be conspicuous as litter. This is accepted by the industry, which claims that because of their high visual impact cans are being singled out for special attention among littered items.

125. Comprehensive litter surveys that can be used for comparative purposes must take account of all types of areas; must use the same methods of classification and definition and must take account of variables such as traffic flow (people as well as motor vehicles), weather conditions and time of the year.

Hazards Associated with Beverage Litter

126. The major hazards mentioned to the Committee as being associated with beverage litter have been concerned with health. Lacerations, particularly to the feet, are caused by both broken bottles

* This includes returnable but nondeposit-bearing beer bottles which comprise 1.8 percent.

and the ring-pulls of cans especially when these are littered on beaches and in parks. Insect pests are said to breed in littered cans and bottles which have become partly filled with water. Some local councils have reported beverage containers as being a major nuisance in blocking storm water drains.

127. It is recognised that the presence of litter induces further littering. As beverage containers are one of the most conspicuous components of litter they would tend to attract a greater volume of additional litter than less obvious items.

Education and Litter

128. The Keep Australia Beautiful Council was inaugurated on a national level in 1971 and now has branches in all States except N.S.W. The major stated aim of the Council is to 'promote litter prevention by the community through education, equipment, enforcement and example'. The Council is supported by a wide range of bodies including government, semi-government and municipal organisations, sections of the packaging industry and individuals. The basic approach of the Council is that litter is caused by people. They advocate that the way to combat litter is to educate people not to litter, provide adequate numbers of bins and other equipment in areas of potentially high litter concentration and to rigorously enforce litter laws against those people who litter. The Council does not see the manufacturers and retailers of throw-away containers having any greater responsibility than the community to see that their products are disposed of properly.

129. The Council believes that litterers may be classified under the following headings:

- The unconscious or thoughtless litterer, e.g. the person who uses a bottle or tin for target practice with an air-gun and leaves broken glass, etc. in his wake.
- The lazy or 'couldn't-care-less' type who knows it's wrong but can't be bothered depositing rubbish in a litter bin, etc. if it is any distance away.
- The surreptitious or secret litterer or rubbish dumper who, although he is well aware he is committing an offence, transports his junk into the country side to dump it somewhere while no one is looking, as far away from his home as he can, so that he can keep his own home neat and tidy.

- The vandal - who gains his enjoyment out of despoiling.

130. The P.I.E.C. told the Committee:

'We believe it has been demonstrated in each area overseas where anti-litter measures have been reasonably successful in reducing the litter problem that education of the public has played a major part ...'

The P.I.E.C. believes there has not been a sustained attempt to educate all sectors of the public to an awareness of litter and the need to prevent it. The Committee was told that a continuing education campaign against litter should be conducted in the schools to include all age groups. A publicity campaign through the media should be aimed at the wider community. These measures would be in addition to publicity measures such as 'National Litter Week' organised by the Keep Australia Beautiful Council.

131. The Committee believes that educating people against litter has played an important role in reducing the litter problem overseas. The countries and states most frequently cited as examples of reducing litter are Oregon and Washington in the U.S.A., British Columbia in Canada and Singapore. However, in all these places education against littering has been accompanied by more important measures. These measures include deposits on non-returnable containers in Oregon and British Columbia, a tax levy on beverage containers to pay for improved litter collection in Washington and rigorous law enforcement in Singapore.

132. These other measures serve an educational function in themselves. The Committee accepts that education is a necessary adjunct to other measures to reduce litter but education alone is unlikely to make any significant effect on the litter problem.

Equipment and Litter

133. The provision of adequate equipment in the form of litter receptacles is the second plank in the Keep Australia Beautiful Council's plan to combat litter. The Committee was told that adequate litter 'equipment' would include both provision of receptacles and their placement in strategic areas. The areas most likely to attract litter are those used by a transitory population. People tend to keep their own immediate surroundings free of litter because of:

- permanency of tenure;
- time available to perform menial tasks;
- pride of appearance;

- personal concern for health and hygiene;
- easy disposal by local government collection or personally to nearby municipal tip or rubbish depot.

134. The Committee was informed that attractively painted receptacles for litter should be provided in shopping centres, on all city and suburban streets, country roads, transport terminals, schools, parks and gardens, beaches, sports grounds and sanctuaries. The provision of refuse receptacles in all motor vehicles and water craft was urged. Litter receptacles should be provided at the source of purchase of take-away food and drink and where consumption of the goods takes place.

Enforcement of Litter Laws

135. Effective litter laws and their rigorous enforcement are advocated by the Keep Australia Beautiful Council as essential in any campaign to combat littering. Organisations responsible for the policing of litter laws such as local governments tend to be pessimistic about the existing laws, and claim that even if effective enforcement was possible, the cost would be prohibitive. The laws are difficult to police because littering occurs along roads, highways and in recreational areas. Litter is frequently dumped at night or at weekends when penalty rates have to be paid to council employees responsible for policing. The Municipality of Kuringai commented on its concentrated efforts to enforce on-the-spot fines for littering: 'It has proved virtually impossible to detect litter offenders, particularly persons in moving vehicles who seem to be the main cause of the spread of litter throughout the community. Results of concentrated efforts in shopping centres have proved fruitless in preventing littering and detecting offenders'.

Litter Laws in New South Wales, Victoria and Queensland

136. (i) New South Wales

Major legislation covering litter in New South Wales is contained in the amendments to the Local Government Act of 1919, namely Act 42 (1970) and Ordinance 55A (1970). The relevant sections are Sections 249C, 289A, 289B, 289C, and 289D. Other State Government Acts have specific clauses on pollution, such as the Railways Act, Crown Lands Consolidation Act, State Pollution Control Commission Act and the Parks and Wildlife Act.

137. Litter is defined in Section 289A of Act 42 (1970):

'Litter includes any kind of rubbish, refuse or garbage and any other article or matter that, when left, deposited, dropped or thrown, or caused to be deposited, left, dropped, or thrown on, or onto, a public place, or public reserve, causes, contributes to, or tends to lead to the defacement or defilement, of that public place or public reserve'.

Penalties range from $5.00 for an on-the-spot offence to $300.00.

138. (ii) Victoria

The Litter Act of 1964, with amendments of 1971 is the main legislation concerning litter in Victoria. Some provisions of the Local Government Act are also relevant. Under the Litter Act, litter is defined as a bottle, tin, carton, package, paper, glass, good or other refuse or rubbish. Under both Acts the maximum penalty is $200.00 and under the Litter Act, imprisonment for 1 month can be imposed in addition or as an alternative. There is also provision to compel the offender to clean up the litter. Councils can apply for the power to issue on-the-spot tickets to litter offenders. The fine under this category is $5.00.

139. (iii) Queensland

The Litter Act 1971 is the major Queensland legislation, providing for penalties for littering ranging from $10.00 as an on-the-spot fine to $300.00 if the litter includes broken glass or a similarly dangerous substance, or if the court thinks the amount of litter is substantial. The offender may also be ordered to pay to have his litter removed.

140. Litter in Queensland is defined as something which could defile or deface the environment and if an offender challenges an on-the-spot fine in court, he is unlikely to be convicted because of difficulty in proving that a littered cigarette packet, for example, was something that would defile or deface the environment.

141. The difficulty of apprehending offenders in the act of littering and of securing convictions has meant that very few local councils have enforced existing litter laws. Those organisations and individuals who have urged stronger litter laws and their more rigorous enforcement seem to be ignoring these difficulties. The Committee was frequently told that fines for littering should be much higher but it was not explained how higher penalties would enable more efficient enforcement.

Estimates of Future Beverage Container Littering

142. The Broken Hill Proprietary Co. Ltd. (B.H.P.) suggested to the Committee that projections based on current estimates of beverage container littering indicated there could be 179.2 million bottles and cans littered in 1982-83. Given that cans are gaining an increasing share of the market at the expense of returnable bottles and that cans are littered proportionately more than bottles, the figure could be higher.

VI ENERGY AND RESOURCES

General

143. Since the Inquiry commenced in August 1973, the dependence of industrialised countries on energy resources has been demonstrated and has heightened community awareness of that dependence. The need for rational and efficient management and use of resources is an issue which cannot be ignored in assessing the implications of a deposit system on beverage containers.

144. A deposit or tax system could produce changes in consumer purchasing patterns affecting the consumption of resources in the forms of raw materials and fuel or energy sources. The desirable aim of resource usage policy, whether for beverage containers or other products, is to use those raw materials which are most abundant, which impose minimum demands on energy resources and those which are most suitable for re-use or recycling.

145. A non-returnable, non-recyclable container is wasteful in terms of the raw materials and the energy expended in its production. If a container can be both re-used and recycled, its drain on resources is considerably reduced. The effect of the number of re-uses (or 'trippage') on resources and energy use is demonstrated by figures provided in a study by the Midwest Research Institute:

Comparison of five different 12 oz. containers for deliveries

1,000 gallons of Beer

Environmental Impact	15 Trip* Returnable Glass	All Steel	Bi-metal Can	One-way Glass	Alumin-ium Can
Energy (10 BTU)	15	35	54	63	89
Virgin Raw Materials (lbs)	920	1800	1700	7700	580
Water Volume ('000 gals)	10	34	34	28	17
Waterborne wastes (lbs)	47	210	550	120	1300
Atmospheric emmissions (lbs)	70	130	220	260	360
Post-consumer solid wastes(cu.ft.)	3	3	3	30	3
Industrial solid waste (lbs)	420	4900	4600	2500	1500

* There is uncertainty over the number of times containers are returned to be refilled. An average of 30 trips has been estimated in South Australia for 10 and 13 fl. oz. soft drink bottles. Milk bottles average 45 refills, large soft drink bottles 12 to 15, and beer bottles 6 to 7.

146. The table shows that the returnable glass container is preferable to other containers currently in use in energy and resource usage terms. The aluminium can is advantageous in terms of quantity of virgin raw materials consumed but is wasteful in terms of energy resources. The raw materials used in the manufacture of glass are less expensive and far more readily available than those used in aluminium.

147. The extent of reserves of the world's natural resources is the subject of considerable discussion and doubt and the implication of finite reserves (and their management) are particularly contentious. The Committee recognises the need for the greatest possible rationalisation of the use of raw materials and believes that those responsible for resource management cannot ignore the long-term implications of resource wastage. The fact that adequate reserves of a certain element are available in Australia to last for a given period and that further discoveries are probable does not in any way justify the use of that material for a purpose where it could economically be replaced by a more plentiful or a renewable material. This principle of resource conservation is recognised by senior executives of the packaging industry itself as is indicated in the statement made by Mr R.S. Gadsden when launching a steel can recycling program. Mr Gadsden stated that 'can makers had an obligation to recover metals even though it was uneconomic to do so at current prices'.

148. Associated with the utilisation of finite resources is the question of the environmental effect of their extraction, processing and eventual disposal. The public is becoming increasingly aware of the environmental impact of mining in its various forms, of water storage for hydro-electric power and of forestry operations and public pressure is mounting against numerous energy and resource related schemes both in Australia and overseas. Without questioning the need or the value of these activities in our society it is recognised from an environmental point of view energy and resource use is a necessity and should be appropriately managed.

Resources

149. The Committee was provided with various figures on reserves of resources related to the production of beverage containers. These figures are questionable because of unannounced discoveries, extensive deposits of low grade material which are not usually included in reserves

and because companies may not wish to reveal the full extent of their deposits. The Committee has not attempted to draw conclusions on the remaining supplies of raw materials as to do so requires speculation on the rate of usage, technical advances in mining and separation processes and on technological changes in industry. The Committee, in arriving at its recommendations, was primarily concerned with the relative availabilities of materials and the environmental impact of their extraction and processing.

Energy

150. Increase in demand for energy is directly related to industrial development and consumption of energy in Australia is currently the fifth highest in the world on a per capita basis, behind the U.S.A., Canada, Sweden and Switzerland. Over the past 10 years our demand for energy has increased at an average of 5.8 percent per annum, the most significant growth sector for primary energy consumption being in the generation of electricity.

Glass

151. Glass is produced from silica (72 percent), soda ash (12 percent), limestone (13 percent) and feldspar using energy derived from the burning of fuel oil. None of the raw materials used are rare although they are non-renewable and the mining of limestone, in particular, has raised considerable opposition from ecology action groups in certain areas. Long-term supplies and the price of fuel oil are in doubt.

152. Glass is used in beverage containers in the form of returnable and non-returnable bottles, the latter being thinner in structure. It has been calculated, taking into account all aspects of resource extraction, manufacturing, distribution and collection, and re-use in the case of returnable bottles, that non-returnable bottles use 4.4 times the amount of energy of returnable bottles. This assumes that these achieve a trippage rate of 15 before recycling.

153. Large quantities of water and labour are required for the transport, washing and handling of returnable bottles but these factors are not significant when compared with the finite resources in the form of energy fuels and raw materials used in initial production. It has been estimated that if non-returnable glass containers completely replace returnables, Victoria alone will have to dispose of an extra 660,000 tons of glass per annum.

Steel Cans

154. Steel cans are predominantly produced from iron ore, tin and lead using energy derived from the burning of coal. Aluminium is also being used increasingly in steel cans in the form of 'easy-open' ends. The manufacture of beverage container cans accounted for 1 percent of total Australian steel production in 1972-73. Of the 304,000 tons of tinplate used in 1972-73 for the manufacture of cans 61,000 tons went into the manufacture of beer and soft drink cans producing approximately 5 billion non-returnable cans. The environmental impact of the disposal of steel cans is greater than production percentages would indicate and B.H.P. states that the biggest area of growth in the use of cans is in beer and soft drinks.

155. As discussed earlier, an accurate estimate of the life of world iron ore, tin and lead reserves is not possible. Tin is, however, in short supply and annual world consumption averaged 183,000 tons between 1968 and 1973 with half the tin produced used in cans. Approximately 15 percent or 27,450 tons of total production is used to make non-returnable beverage containers. Utilisation of one of the world's most precious metals cannot be justified on the grounds of consumer convenience if economic alternatives exist.

156. The Committee was informed that chromium was an alternative to tin in the plating of steel. The British Steel Corporation by 1980 expects to be using it for 20 percent of its production destined for beverage containers. Australia has no reserves of chromium and its import for steel plating would appear to be uneconomic and is in short supply.

157. Exploitable reserves of lead are limited and although other minerals used in the manufacture of tinplate such as iron ore and limestone are considered abundant, there is uncertainty about the quality of lead deposits and factors which may make mining of some of the reserves uneconomic.

158. The consumption of coal to produce steel for beverage containers is approximately 33,000 tons per annum and it has been claimed that if steel cans were replaced by returnable glass bottles, energy savings of 50 percent could be achieved.

Plastics

159. Petroleum and natural gas are the basic resources used for

the manufacture of plastics and it has been estimated that 1 to 1½ percent of the world's annual petroleum production is used in the production of plastics. A.C.I. stated there is a shortage of raw materials for plastics in Australia but say it is 'not significant'. The Committee considers that Australia's dependence as an industrialised country on continuous supplies of petroleum products has been demonstrated by international events of the past eighteen months and the need to conserve Australia's own production of these materials is apparent.

160. The Australian consumption of plastics in 1973 was an estimated 458,000 tonnes of which 16 percent was used for packaging.

161. A study by the Stanford Research Institute reveals that plastics require less energy per kilogram of production than steel or aluminium but more than glass which can be re-used and recycled. This is not the case with plastics at the present time. The strongest arguments against the use of plastics for beverage containers are pollution created in production and problems associated with the disposal of the used product.

162. Plastics can be burned to produce heat energy in the form of electricity or steam but it was pointed out by the Sydney Conservation Society that there is no feasible substitute for coal and oil for use in Australia's chemical industry. Increasing usage of plastics in the packaging industry could place the future supply of raw material for other important industries in jeopardy.

Aluminium

163. Production of aluminium involves the mining of bauxite, refining the ore with a caustic bleach and a process of crystallisation and calcination to produce commercially pure aluminium, using hydro-electricity as the source of energy. In 1969 beverage cans accounted for 5.6 percent of the total Australian aluminium production and the proportion would be substantially greater now considering that the aluminium can was only introduced into Australia during that year.

164. Estimates of the life of the world's reserves of bauxite vary from 30 years to an indefinite period calculated on estimated reserves of 7,000 million tons. This does not include deposits which are too low in grade for present use or which are in remote areas or at depths too great for profitable mining. These additional deposits have been estimated at a further 10 million tons.

165. It can be seen from the table at paragraph 145 that the aluminium can is extremely expensive to produce in terms of energy consumption using approximately 6 times the amount of energy that is used for returnable glass containers and 2.6 times the amount for steel cans. The Committee was informed by Alcoa of Australia Limited (Alcoa)that aluminium production accounts for 2 percent of Australia's total energy usage.

166. Aluminium cans are recyclable although there are disadvantages in the process with respect to pollution. Recycling of aluminium is discussed at some length in the next chapter.

Fuels

167. Demand for the major individual fuels is determined by price, efficiency, availability, cleanliness and convenience. In 1961 coal was the source of 53 percent of total Australian energy consumed with petroleum providing 39 percent and hydro-electricity 2 percent. Since then, coal has declined to 40 percent with fuel oil and natural gas taking over in some traditional coal markets.

168. Australia has substantial reserves of coal and natural gas while the only energy base likely to cause supply problems for Australia in the near future is oil. Domestic oil production provides approximately 70 percent of current requirements. However, proven reserves in relation to longer term needs are inadequate. It has been estimated that if no more deposits were discovered Australia could face a domestic production deficit of around 7 billion barrels of crude oil by the year 2000.

VII RECYCLING

General

169. The Committee has accepted the definition of recycling as being 'the deliberate return of an article to an earlier state of the original manufacturing cycle so that it can be reprocessed into a further supply of that, or similar articles'. The objective of recycling is to reduce the quantity of natural resources drawn from nature's finite supply. For recycling to be beneficial, it must be economically and commercially viable with the net gain in resource and energy saving being greater than the losses involved in recycling.

170. The suitability of products for recycling varies considerably depending on the complexity of the materials, the capital and operating costs of equipment, facilities for transport, sorting and storage and the net value of the materials which are produced at the end of the process. Glass is currently recycled at the rate of 45 percent of total production and it is claimed that this could rise to 65 percent. The level of aluminium recycling is about 25 percent and increasing. It was stated in evidence that B.H.P. claim a scrap recycling rate of over 25 percent of total steel production but 85 percent of this is scrap created in the production process and only 15 percent is returned scrap. Used plastics and plastic-coated cardboard cartons cannot be recycled.

Glass

171. Of the beverage containers in use today, only glass containers are both recyclable and re-usable. The Australian Council of Soft Drink Manufacturers estimated the figures for re-use at:

26 oz. bottle	12
750 cc "	11
6½ oz. "	14
10 oz. "	19
250 cc "	11
32 oz. "	8
42 oz. "	9

The Committee was advised that in 1967, 100 million dozen bottles were returned in Victoria for re-use in beer, soft drinks and milk. The re-use of returned bottles has fallen off significantly in recent years with the advent of non-returnable containers and the thinner non-returnable bottle.

172. Broken glass known as 'cullet' plays a valuable role in the manufacture of new glass as it lowers the melting temperature of the batch resulting in lower production costs through fuel savings as well as reducing the amount of raw materials required. A.C.I. claims that currently for every 100 tonnes of glass produced over 40 tonnes of recycled glass are added to Australia Glass Manufacturers' furnaces. The Committee was told that a U.S.A. firm (McCarthy & Co.) used up to 55 percent cullet in each batch due to improved technologies and they expect this to increase.

173. Research is being conducted into other uses for broken glass and practical applications include the production of 'glasphalt' roadmaking material and an insulating material similar to fibreglass and building blocks. Glass beads are also used as relectors in road marking paint.

174. The manufacture of returnable glass bottles in preference to non-returnable bottles and the use of returnable bottles as cullet in glass production and in other manufacturing processes at the end of their effective life would be an economic and environmentally acceptable use of resources and energy.

Steel

175. Steel cans currently in use consist of tinplate with a lead soldered seam and frequently an aluminium top. The cans are coated inside with a thin layer of plastic and painted and lacquered on the outside. Its varied composition makes it difficult to recycle and although this is possible in Australia with the development of de-tinning plants, it is uneconomic. De-tinning uses large quantities of caustic soda (whose production generates mercury wastes) and for every tonne of steel cans processed only 3 kg of tin are recovered.

176. De-tinning is necessary before scrap cans may be used in the Basic Oxygen processes which account for 66 percent of Australian steel production as a tinplate scrap component of greater than 5 percent means that the steel produced is brittle and the furnaces are damaged.

177. Significant problems are involved with the collection, separation and volume reduction of used steel cans. Research has been undertaken into the development of magnetic recovery plants at municipal dumps and suggestions have been made that a tax be placed on metal containers with the revenue being distributed to local councils to spend

on solid waste disposal and sorting equipment including magnetic separators. De-tinning is rendered ineffective if steel cans are compressed. Therefore, transport costs for the empty cans to be returned to the factory are very high.

178. In response to public criticism of the waste disposal and litter problems caused by steel cans the Steel Can Plan was instituted by a group of manufacturers of steel cans. The Plan involved the establishment of can collection centres and the recycling of collected cans. The short-term aims of the Plan were the 'conservation of resources and the reduction of solid waste and litter; and providing a supply of cans for technical research'.

179. The Steel Can Plan has been criticised by environmental action groups which claim there was no attempt to recycle cans on a significant scale and that most cans obtained were in fact dumped. The truth or otherwise of these allegations has little real impact on the situation since the recycling of steel cans has been shown to be uneconomic and impractical under present conditions. The American National Centre for Resource Recovery stated that in terms of energy consumption, 'recycling of tinplate consumes almost as much energy as does production of the can from virgin materials'. Steel scrap is currently valued at around $20 per tonne.

180. Research is being conducted into alternative uses for used steel cans and possibilities include construction applications in roads and concrete structures, drain liners and harbour reclamation. De-tinned steel cans are being used extensively in the U.S.A. as precipitation iron to recover copper from low-grade ore in a process which produces 15 percent of the U.S.A. copper output. Steel can scrap is also used in the production of ferro-alloys and as feedstock in furnaces without being de-tinned.

181. It is technically possible to recycle steel cans although the process is complex. It is not economically viable and the benefits in terms of resource and energy conservation are negligible.

Plastics

182. The Plastics Institute of Australia informed the Committee that 'plastic beverage containers cannot at present or in the foreseeable future be economically re-used or recycled'. A representative of the Institute told the Committee that even if recycling of plastics became

technically possible, a greater amount of energy would be consumed in recycling than is used in the manufacture of the initial product.

183. The plastic-coated cardboard container is widely used in Australia particularly for milk and fruit juices. At present no technology exists to enable these containers to be recycled or re-used. The plastic coating is one-thousandth of an inch thick and being made from polyethylene is degradable in sunlight although suitable conditions for its decomposition seldom occur in our solid waste disposal system.

184. In the U.S.A., attempts are being made to prevent the non-biodegradable containers entering the solid waste stream by converting them into re-usable products usually of a much lower value. Examples of its uses are the making of a compound material for building bricks and road metal, the grinding of plastic bottles to replace sand in concrete and as an ingredient in asphalt and wallboard.

Aluminium

185. Representatives of Comalco Limited (Comalco) told the Committee that aluminium had 'inherent and demonstrable benefits which underline the national reclamation programme'.

186. There are no technical problems involved in the recycling of aluminium cans although the recycling process can cause serious environmental damage in the form of air pollution through the dispersal of gases from the oils, paints and lacquers on the cans and the production of aluminium chloride and aluminium fluoride. Emission control equipment is essential at aluminium recycling plants to prevent noxious gases entering the atmosphere.

187. Recycling of aluminium cans is costly and the associated problems of collection, transport, storage and pollution emission have not yet been satisfactorily overcome although research is being conducted into can crushers and other technology that will assist in their processing. Aluminium cans can be crushed and baled by portable crushing machines which can reduce 400 cans to a volume of 1 cubic foot compared with the uncrushed ratio of 35 cans to the cubic foot without detrimental effect on the cans for recycling.

188. Aluminium scrap was valued at $224 per ton in 1973 or approximately 0.5 cents per can which does not appear to provide sufficient incentive for the average consumer to return them to collection centres. This is indicated by the 1972 return rate of 11 percent of total production. Although Comalco estimate thet 25 percent of aluminium cans will be

recycled by the end of 1975, they state that unlimited quantities of scrap aluminium cans can be recycled and that at $224 per ton it is an economic proposition if the energy consumption for recycling equivalent to 5 percent of the energy needed to produce the original metal is taken into account.

189. Scrap aluminium is remelted, re-alloyed and cast into secondary ingots which represented 15 percent of Australian aluminium consumption in 1974. There are approximately 150 diecasters and foundries in Australia requiring secondary aluminium ingots and the market is growing at 7 percent per annum.

VIII OVERSEAS EXPERIENCE WITH BEVERAGE DEPOSITS AND TAXATION LEGISLATION

General

190. Throughout the Inquiry witnesses directed the Committee's attention to the effects of various forms of deposit legislation in areas of the U.S.A., Canada and Scandinavia. Proponents of a deposit system pointed to the beneficial effects of the schemes which included the reduction of the beverage container component of litter, the economic use of natural resources and the increased public awareness of environmental issues. Opponents of the deposit system generally argued that although some limited degree of success might have been achieved in these areas, the cost in terms of disruption to industry and investment, umemployment, loss of consumer convenience and increased retail prices, outweighed the advantages of the deposit system.

191. The Committee has been reluctant to rely too heavily on the results of overseas deposit systems as it considers that insufficient time has elapsed since the introduction of the systems for sufficiently detailed and accurate assessments to be made of their effects on the beverage industries, on consumer acceptance or reaction and on litter and solid waste.

192. Although there is a considerable amount to be learnt from the study of overseas deposit and litter control legislation, the Committee is primarily considering the need for a uniform substantial deposit on beverage containers which would apply in all States and Territories of Australia, whereas the deposit systems which were most frequently discussed in evidence were measures taken by individual States and Provinces of the U.S.A. and Canada respectively. The only exceptions to this were the tax systems of Norway and Sweden and the litter control scheme of Singapore which are discussed below.

193. The effects of the various and widely differing approaches to deposit systems in the U.S.A. and Canada were studied by the Committee to the extent permitted by the reliable documentation and analysis available at the time. It was concluded that the degree of effectiveness of the systems varied according to a number of factors which included:

(a) the fundamental aim of the legislation which could be to reduce the quantity of litter generally and reduce the beverage container component of litter, to reallocate

and conserve natural resources or to emphasise recycling of beverage containers rather than their re-use;

(b) the existing structure of the beverage market in terms of the extent to which non-returnable containers has taken over from the original returnable containers;

(c) the extent to which containers were produced within the area covered by the legislation and the consequent effects on employment, investment and re-equipping of industry;

(d) the extent to which beverages consumed in the deposit system area were produced within that area by local companies or were imported from interstate sources;

(e) the proximity of alternative purchasing centres in neighbouring States where a deposit system did not operate;

(f) the distance which the full containers needed to be transported from the manufacturer and filler to the point of sale and the distances for return of empties for recycling or refilling; and

(g) the degree of sophistication of the purchasing public and their willingness to accept the loss of some degree of convenience and perhaps marginal price rises in order to reduce the volume of unsightly litter and solid waste.

United Stated of America and Canada

194. The deposit systems operating in the U.S.A. and Canada are in their infancy and subject to review and amendment. The British Columbia Litter Act 1970 was amended to strengthen its provisions early in 1974 bringing it into line with the Oregon Beverage Container Act 1971 or 'Bottle Bill' as it is popularly known. The Oregon legislation became effective in October 1972 imposing the most comprehensive deposit system for beverage containers operating on the American continent and it is understandable that the Oregon experience has become the most publicised and contentious, having now survived a challenge in the Courts and a subsequent appeal against the Court's ruling in favour of the legislation. The Act requires a minimum 2 cent refund on the return of 'certified' containers of beer, malt beverages and carbonated soft drinks and a 5 cent refund on the return of all other beverage containers. A beverage container is certified it it is re-usable by more than one manufacturer.

The Act forbids the sale of 'any metal beverage container so designed and constructed that a part of the container is detachable in opening the container without the aid of a can opener'.

Report on Oregon's 'Bottle Bill'

195. The 'Bottle Bill' provides that prior to 1 January 1975 the Legislative Fiscal Committee of the Legislative Assembly shall report on the findings of a study on the operation of the legislation. The report, prepared by a firm of consultants and as yet to be accepted by the Assembly, was released in September 1974. It has been criticised as being inconclusive but the report indicates that the legislation has achieved its primary objectives which were to reduce the beverage container component of litter and to increase usage of returnable bottles. The report concludes that during the 11 months after the law went into effect, beverage container litter declined by 66 percent compared to the previous year and can manufacturers lost approximately 83 percent of their beverage can sales in the Oregon market.

196. A consumer opinion survey revealed that 91 percent of those interviewed in September 1973 approved of the deposit scheme and only 5 percent disapproved despite higher prices for beverages estimated at 6.7 to 8.9 cents per six-pack of beer and 5 cents per six-pack of soft drinks during the second year of operation according to the report. Over 80 percent of consumers interviewed indicated they were willing to pay 'slightly' higher prices for beverages if it would lead to a reduction in litter.

197. The report has been criticised for its failure to clearly assess the costs incurred by the 5 industries involved in the beverage industry; the soft drink producers, brewers, beer wholesalers and distributors, can manufacturers and glass bottle manufacturers who experienced increased costs and/or decreased profits in the first year of the law's operation. On information available to the Committee, it was not clear whether this was an initial effect only of the legislation as much of the expenditure incurred by the industries was investment in re-equipping to the demands of the new system.

The Consumer and the Can

198. The aim of the 'Bottle Bill' was to reduce the beverage container component of litter in a State which is renowned for its scenic beauty and attracts a large number of tourists. It was only after

the enactment of the legislation that the issues of resources and energy conservation were taken up by observers of the Oregon experience and this has resulted in some valuable and controversial research being conducted. The Committee was particularly interested in two aspects of the Oregon situation: the enthusiastic acceptance of the legislation by consumers and the fact that despite the ban on ring-pull cans, the can industry remained in the beverage container market and is now, with the introduction of non-detachable 'pop-top' cans, increasing its reduced share of the market.

199. On information available to the Committee deposit schemes operating not only in Oregon but in British Columbia, Alberta and Saskatchewan are strongly supported by the majority of consumers. This is despite some price rises and the loss of convenience which is used by the container industry to justify the use of metal cans as beverage containers and said to be so important to the consumer. Figures given in evidence on the increasing market share of 'pop-top' cans in Oregon from less than 1 percent to 2.8 percent in September 1973 and 4.5 percent in February 1974 indicate that the consumer who values the convenience of a metal beverage container will continue to purchase that container under a deposit system.

Alberta

200. Although it is not intended to discuss all the deposit systems examined by the Committee, it is worth considering the Alberta system to illustrate the differences in circumstance and approach to the system operating in Oregon.

201. The Alberta Beverage Container Act 1971 took effect on 1 January 1072 defining a beverage for the purposes of the Act as 'carbonated or uncarbonated soft drinks' and 'liquor'. Uncarbonated soft drinks are exempted by the Regulations to the Act as are beer and malt beverages which were specifically covered by the Oregon legislation. Beer is exempt because it is not sold in cans in Alberta and an efficient deposit-return system for beer bottles is operated by the breweries.

202. The Regulations to the Act provide for a minimum deposit equal to the manufacturers' deposit of 2 cents per container for soft drinks and 5 cents for wine and liquor containers. In this system the retailer pays the deposit to the manufacturer for containers delivered and passes this charge on to the consumer. On the return of the empty container the retailer refunds the deposit to the consumer and receives from the

manufacturer the original deposit in the case of non-refillable containers only. For each refillable container collected the manufacturer must pay to the retailer the original deposit plus a premium of 1 cent.

Collection Depots

203. In Oregon and the other States and Provinces where deposit schemes are in operation, the relevant Acts provide for the establishment of container collection depots by private industry. It is only in Alberta that collection depots are operating, although British Columbia had a collection depot system which proved to be non-viable and subsequently closed.

204. The Alberta depots, operated by Contain-A-Way Ltd., operate on a drive-in, drive-out assembly line arrangement with the depot operator refunding the standard deposit to the consumer and receiving from the manufacturer the deposit plus 1 cent for all beverage containers collected whether refillable or non-refillable. In August 1973 there were approximately 160 depots operating in Alberta with 21 in the two major urban areas. At that time, the largest depot was handling over 1,000,000 containers per month. The operators have stated that the system was made viable by the turnover of wine and spirit bottles and because of a proportion of unclaimed deposits.

205. A report on the effects of the deposit scheme prepared by the Pollution Control Division of the Alberta Environmental Protection Services concluded:

> 'As a litter control measure, the public have reported practical elimination of litter by beverage containers. As far as public contact is concerned, the Beverage Container Act is perhaps the most well known and supported of any recently enacted legislation'.

Washington - Litter Control

206. The Committee also considered the approach taken to the litter problem in the State of Washington through the Model Litter Control Act 1971. The legislation established a state-wide total litter control program that is financed through a .015 percent tax on thirteen categories of firms whose products were assessed as contributing to the litter problem. The tax is levied against value of products manufactured in the State in the case of manufacturers and on gross sales proceeds in the case of wholesalers and retailers. Of interest to the Committee was the fact

that of the thirteen categories under tax, six are related to the beverage industry. They are soft drinks and carbonated waters, beer and other malt beverages, wine, glass containers, metal containers and plastic or fibre containers made of synthetic material.

207. The Act allows for the imposition of fines for violations. Litter bags are issued to all owners of motor vehicles and boats at the time of annual registartion and to all vehicles and boats entering the State. It is an offence under the Act not to use the litter bags.

208. All tax assessments, fines, bail forfeitures and other funds collected or received in relation to the Act are paid into the Litter Control Account from which the Department of Ecology annually allocates funds for the study of available research and development in the field of litter control.

National Systems - Scandinavia

209. The only nation-wide beverage container control schemes considered by the Committee are those operating in Norway and Sweden. In that they are national schemes, they have the advantage of internal consistency which is lacking in the American and Canadian systems. It is known that in Alberta, for example, a considerable degree of profiteering was indulged in at the commencement of their scheme by people who imported containers from adjoining Provinces where no deposit scheme was operating and claimed the deposit from the Alberta container collection depots. This type of exploitation of a deposit system is not possible between countries with customs controls.

210. The Swedish legislation which became effective on 1 March 1973 provides for a taxation surcharge of about 2 cents [1] to be levelled on both re-usable and non-reusable containers of juices, uncarbonated beverages, soft drinks, malt liquor, wines and spirits. The surcharge is payable by the container manufacturer or by those who sell or use containers which are acquired without surcharge from the manufacturer or which are imported into the country. It is interesting to note that the legislation deliberately imposed the tax on returnable containers as an extra incentive for the industry to re-use the container. A returnable container used only once and discarded or even recycled costs the manufacturer or filler 2 cents whereas if it is re-used 10 times the tax is reduced to .2 cents

[1] Calculated on exchange rates current in October 1974.

per use. A non-returnable container incurs the full 2 cents tax on production and no concession is made for recycling.

211. It is noteworthy, that in addition to the tax surcharge, a voluntary deposit system operates on returnable containers and the level of deposit was raised after the enactment of the tax legislation to about 4.3 cents to encourage consumers to return empty bottles. Presumably, this measure was taken by the manufacturer to achieve the greatest possible economies on the tax surcharge.

212. The Swedish system allows for the import of containers and the tax surcharge is collected with the customs duty. The retailers within Sweden can also elect to import containers without tax and pay the surcharge at the point of sale. On the export of the empty container, 90 percent of the original tax surcharge is rebated.

213. In Norway an 11 cent [1] fee is imposed on the manufacture of a beverage container can and this has resulted in the elimination of the metal can from the beverage container market. Norwegian consumers are not prepared to pay the additional and substantial fee for the convenience of canned beverages and apparently consider that the measure is worthwhile in that it contributes to the reduction of litter.

214. The fee is paid into a separate fund and not to the general revenue as a tax.

Singapore

215. Singapore was frequently cited to the Committee as an example of an area where education and enforcement of litter laws had effectively controlled the litter problem.

216. The impact of the anti-litter drive on usage patterns of beverage containers has been difficult to assess from available information. The Committee was informed by the Ministry of the Environment of Singapore that beverage containers had not constituted a significant proportion of litter before the introduction of litter laws. The deposit system was and remains in operation and empty containers were returned to the manufacturer via retail outlets.

217. For this reason it is difficult to form conclusions about the impact of the anti-litter program in Singapore on beverage container usage and to make worthwhile comparisons with the Australian situation.

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[1] Calculated on exchange rates current in October 1974.

218. Both beer and soft drink are canned locally in a 12 oz. can which does not carry a deposit. However, the price of beverage in a can is higher than that of a bottle which makes canned products relatively unattractive to the local consumer. More than 95 percent of canned beer and soft drink is exported and the small local market is provided primarily by expatriates and tourists.

219. Although it is not disputed that the anti-litter campaign has been successful it is doubtful if the harsh system of penalties on which the Singapore system depends for its effectiveness would be acceptable in Australia. By contrast with Australia, Singapore is a small densely populated country where control measures and education reach the whole population and can be uniformly applied.

IX COSTS AND BENEFITS OF A COMPULSORY DEPOSIT SCHEME

General

220. The Committee requested its technical advisers on economic matters to prepare a paper outlining likely implications for a uniform substantial deposit on beverage containers. This was to be based on the evidence and other material provided to the Committee during the course of its public hearings. The Committee accepted that any study which attempts to quantify costs and benefits requires a consistent conceptual framework; that in order to carry out such an assessment, a number of assumptions have to be made.

221. This section incorporates the findings and conclusions reached in the advisers' paper as the Committee understands them. The paper was presented to the Committee in September 1974.

222. Beverages are packaged in returnable and non-returnable containers. Two systems for the retrieval of the former are in operation: the refundable-deposit system, in which consumers return containers to manufacturers via retailers; and the specialist-collector system, in which bottle merchants, marine dealers, scouts and other groups collect bottles and resell them to the manufacturer or his agent. Non-returnable containers are usually collected and disposed of via the garbage disposal system. A supplementary collection system involving collection centres established and operated by the container manufacturer, is used to a limited extent. In both systems containers may be dumped or reclaimed as scrap or cullet.

223. Containers are also disposed of by discarding as litter in public and private places. A proportion of returnable containers enters the solid waste disposal system, including litter.

224. These systems interact in various ways. Returnable bottles discarded as solid waste by consumers are frequently salvaged by garbage collectors and diverted into the specialist-collector system. If non-returnable containers were compulsorily brought under a refundable deposit system, they would nevertheless eventually be disposed of as waste, scrap or cullet. Much litter is eventually cleaned up and processed through one of the other systems.

225. If all beverage containers carried a deposit, this would result in expanded usage of the refundable deposit system and reduced usage of the other systems, including the 'litter system'. If the mix of containers in use remained unchanged, the effect of the legislation would

be to introduce an element of double-handling into the disposal of cans and non-returnable bottles: a proportion of these would be returned to retailers or collection centres for collection of refunded deposits, before they were consigned to the solid-waste disposal system. The cost of this double-handling would be borne largely by consumers. The system would impose a money cost on litterers equal to the value of the deposit per container discarded. As a result, litter would be reduced. Voluntary litter clean-up would also be encouraged, as scavengers collected containers for their refund value. A cost equal to the deposit would also be imposed on consumers who consigned containers directly to the solid-waste disposal system, but this cost would be wholly or partially offset by a benefit to beverage manufacturers in the form of unclaimed deposits. The same is true of the costs imposed on litterers. These gains to manufacturers may well be passed on to consumers in the form of lower beverage prices. If this occurs, the refunds foregone by litterers and those who put their containers directly into the garbage will accrue to beverage consumers generally. A transfer would also occur if one person discarded a container that was salvaged for its deposit value by another person.

226. Thus, with an unchanged container mix, the principal benefit of the legislation would be a reduction in the container content of litter. The costs would be those associated with the return to points of sale, or to collection centres, of containers that are not re-usable. A subsidiary benefit which would exist if it were economic to recycle the metal and glass content of the non-returnable containers is the sorting of the recyclable material achieved by its return to collection points.

227. However, it is unlikely that the container mix will remain unchanged. At the present time, the recommended retail price of drinks in non-returnable containers generally exceeds the net price of the drink in a returnable container of the same size by 3 cents, and a large and growing number of consumers are willing to pay this price premium presumably for the convenience of the disposable container. The convenience consists of not having to return the container and, in the case of cans, their lightness, lack of bulk and quick-chilling and easy-opening properties, as compared with bottles. If a compulsory deposit of 5 cents were added to the price of a non-returnable container, the convenience premium would rise to 8 cents, assuming the net price differential remained at 3 cents. Consumers could obtain the convenience of non-return at a

cost of 5 cents by purchasing returnable bottles and discarding them. The technical advisers concluded from the foregoing that non-returnable bottles would disappear from the market but some consumers would be prepared to pay 3 or 4 cents for the convenient handling and storing qualities of the can so that it is not clear that the can would be eliminated by the imposition of compulsory deposits.

228. To the extent that compulsory deposit legislation induced a shift in the container mix away from non-returnable bottles and cans and in favour of returnable bottles, additional benefits would accrue and additional costs be incurred. The benefits would consist of reduced total expenditure on the manufacture of new containers and a reduced quantity of discarded containers entering the solid waste disposal system. The costs would consist of increased expenditures on the sorting, assembling and washing of empty bottles, and interest on the inventory of returnable bottles. Also, bottles are more expensive than cans to fill, store and transport.

229. It is possible that a reduction in the proportion of cans in the container mix would, by itself, result in some further reduction in litter if people are more prone to throw away a can than a bottle. The can, on account of its portability, is particularly attractive to picnickers and motorists and if eliminated from the market, there might be a reduction in the quantity of beverage consumed in the quantity of beverage consumed in public places, and perhaps a bigger reduction in the number of containers purchased for this purpose.

230. The technical advisers summarised the major costs and benefits of a compulsory deposit scheme for beverage containers as follows:

1. Direct effects of the deposit (i.e. effects that are independent of any resulting change in the container mix).

Benefits	(i)	Reduction in litter;
	(ii)	Possible benefit from segregation of recyclable materials.
Costs	(i)	Increased expenditure by retailers and beverage manufacturers on collecting and disposing of empty containers, collecting and refunding deposits;
	(ii)	Inconvenience experienced by consumers in returning containers and collecting refunds.

2. Indirect effects, arising from a change in the container mix induced by the increased relative price of beverages in non-returnable containers.

Benefits	(i)	Saving of resources used in container manufacture;
	(ii)	Savings in costs of solid waste disposal;
	(iii)	Possible further reduction in litter.
Costs	(i)	Increased expenditure by beverage manufacturers on processing returned containers and on filling, storing and transporting containers;
	(ii)	Inconvenience caused to consumers by substitution of bottles for cans.

Soft Drinks

231. If the container mix remained unchanged, beverage manufacturers would incur added costs in collecting returned empty cans and non-returnable bottles from retailers and/or collection centres and refunding deposits to retailers. Each retailer's return would have to be checked to determine the due refund and the containers disposed of in such a way that they could not easily be salvaged by scavengers and re-presented for a further refund. Manufacturers would benefit from unclaimed refunds and from interest earned on deposits held pending refund.

232. If consumers substituted returnable containers for non-returnable containers, additional collection costs would be incurred. Instead of being disposed of as waste or scrap, the returned containers would be sorted and washed prior to re-use. Manufacturers would also experience cost increases because of the greater weight and bulkiness of bottles leading to higher transport and warehousing costs and the apparent higher cost of operating bottling plants. However, they would make substantial savings in expenditure on new containers.

233. Retailers' costs would rise because additional transactions in empty containers would be made and the containers would be handled, sorted and stored.

234. The approach adopted by the advisers to estimate the likely magnitudes of these cost increases and cost savings was to assume, initially,

that the price difference between beverages in non-returnable and returnable containers reflects the net cost difference. The two major components of this net cost difference would be the saving in container costs proper associated with a switch into returnable containers and the increase in collection and processing costs. The latter is further subdivided into costs incurred by retailers and those incurred by manufacturers.

The Net Cost Advantage of Returnable Containers

235. The recommended retail prices and actual retail prices of soft drinks in non-returnable containers generally exceed those of drinks in returnable bottles by 3 cents, except in the case of the standard non-ring-pull can, where the difference is 2 cents. This is the difference between the price of the non-returnable package and the net price of the returnable package. However, since a proportion of returnable containers is not returned, the price received by beverage manufacturers is a weighted average of the net price and the gross price representing net price plus deposit. Assuming a 90 percent return rate as being typical of soft drinks and a 5 cent deposit operates, the average price received for returnable packages is the net price plus 0.5 cents. The average difference in price received at the retail level for non-returnable and returnable packages is about 2.5 cents.

236. If it is assumed that the retail prices of different container types reflect their costs of manufacture and distribution, it follows that beverages in non-returnable containers cost approximately 2.5 cents more per unit than beverages in returnable containers. For every non-returnable container replaced by a returnable container, a 2.5 cent saving in real resource costs would be made. This saving is a net amount, made up of a larger saving in the costs of containers, partially offset by the increased handling and processing costs associated with returnable containers.

Container Costs

237. Table I shows the weighted average price (weights equal to each container's share of the non-returnable container market for soft drinks) per non-returnable container on the basis of industry projections of the container mix for 1973-74. Alternative prices of 6.25 cents and 4.7 cents for cans are included. The first figure comes from the Report prepared by W.D.Scott and Co. for the Packaging Industry Environment Council, while

the latter was quoted in evidence before the Committee by representatives of United Packages Ltd. The difference may be explained if the 6.25 cents refers to a ring-pull can, whereas the 4.7 cents is an average price of all cans, including plain cans and 250 ml cans. (The figure of 4 cents for 250 ml cans in the first price column is an estimate).

TABLE I

Container Type	%	Assumed Container Price (cents) 1	2
Can 250 ml	7	4	4.7
370 ml	69.7	6.25	
Non-returnable Bottle 10 oz.	9.4	3.5	3.5
26 oz.	14	6.75	6.75
Weighted Average Price		5.92	4.88

238. It is assumed non-returnable containers would be replaced by returnables of similar size and the weighted average price for these is given in Table II.

TABLE II

Container Type	Market Share %	Assumed Container Price (cents)
Returnable Bottles - Small	86	7.5
- 26 oz.	14	10.0
Weighted Average Price		7.85

239. The average cost for returnable containers per use depends on the proportion that are returned. At the assumed return rate of 90 percent the average container cost per use is 0.785 cents. Comparing the per use costs of non-returnable and returnable containers indicates savings for returnable bottles ranging from 4.095 to 5.135 cents. Interest on the inventory of returnable bottles should be deducted from this difference to give a true comparison but no data on the average time a bottle takes to make its trip has been provided to the Committee.

Processing Costs

240. Of the difference in container costs proper in favour of returnable bottles, which is estimated to lie in the range 4.095 to 5.135 cents, approximately 2.5 cents is passed on to the consumer in the form

of lower retail prices. The remainder that is not passed on presumably reflects the additional processing costs associated with returnable bottles and is between 1.595 and 2.635 cents. Part of this cost is accounted for by the higher margins taken by retailers on returnable bottles. Taking the Schweppes price list as representative, the following margin differences exist:

Container	Retail Margin (Cents)	Difference (Cents)
750 ml returnable bottle	8.167	
750 ml non-returnable bottle	7.167	1.0
370 ml returnable bottle	5.6	
370 ml ring-pull can	5.25	0.35
370 ml standard can	5.125	0.475

241. These margins are for small shopkeepers: supermarket margin and the margin differences would be approximately half the above. On this assumption, the weighted average margin difference for disposable containers is 0.456 cents, calculated as follows:

Type of Container	Type of Outlet	Share of Market (%)	Difference in Margin (Cents)
Can	Small Traders *	45	.375
	Supermarkets	25	.187
Non-returnable bottle	Small Traders *	18	1.000
	Supermarkets	12	.500
	Weighted average margin difference:		.456

* Including hotel and liquor stores

242. Subtracting this figure of 0.456 cents from the container cost savings not passed on to the consumer leaves an amount ranging from 1.139 to 2.179 cents.

243. If price differences associated with container type reflect cost differences, a switch from non-returnable to returnable containers would effect a net cost saving of about 2.5 cents per beverage filling.

244. The saving in container costs proper depends on the prices of returnable and non-returnable containers of similar size and on the return rate or trippage achieved with returnable containers. Verified data on either of these items is not available but from information in the evidence, it is estimated that the saving would be in the range 4.095 to 5.135 cents per filling.

245. The difference between the saving in container costs proper and the net saving represents the costs of collecting and processing empty bottles. It is assumed this cost would be from 1.595 to 2.635 cents per filling. If retail margin differences associated with container type reflect retail cost differences, the additional retail costs of handling returnable containers amounts, on average, to about 0.456 cents per container sold. This leaves from 1.139 to 2.179 cents as additional costs incurred by manufacturers.

246. The estimates made depend critically on a number of assumptions; it would be surprising if there were marked differences in the profitability of canned and returnable bottled soft drinks. If such differences did arise it could be expected that beverage manufacturers would promote sales of the more profitable type of container by price reductions and/or advertising, or by raising the prices of the less profitable containers and in the process tend to restore the balance of profitability. The fact that sales of canned drinks have been growing rapidly is consistent with the view that profit margins may be higher for cans. The Scott Report states that 'on the basis of discussions with industry and returns obtained it was estimated that there may be 30 cents per case difference in profit contribution in favour of canned soft drinks'. If this is accurate, then the retail price difference between cans and bottles would overstate the net cost difference by 1.25 cents, assuming that 'case' refers to a 2 dozen case and the net cost difference would be halved from 2.5 to 1.25 cents. The statement in the Scott Report is put forward in a rather tentative manner. Second, and more important, it is not clear what is meant by 'difference in profit contribution'. For example, profit contribution may mean the difference between unit price and unit direct costs of labour and materials but if canning were more capital intensive than bottling then part of this profit contribution would represent a cost of capital. For these reasons it is doubtful whether a pure profit differential as high as 1.25 cents per filling in favour of cans exists but it would not be surprising if there is some differential in favour of cans. If there is, then the calculations are biased in the direction of over-estimating the savings associated with the use of returnable containers.

247. The assumption that container prices reflect their costs may also be inaccurate. Glass manufacture in Australia is virtually monopolised by one firm and only a few firms are engaged in can manufacture.

To the extent that they include monopoly profits, container prices will overstate their real costs of production. Furthermore, considerations of market strategy may induce container manufacturers to take above-average profit margins on some of their products and below-average profit margins on others; hence, relative prices may not be a certain guide to relative costs. In the absence of detailed information on these matters, these possible sources of bias are simply noted.

Retailers' Costs

248. If it is assumed that retail margin differences reflect retail cost differences, the costs to retailers of handling returnable containers exceeds that of handling non-returnable containers by 0.456 cents per container.

249. The Scott Report adopts a synthetic costing approach in estimating increased costs imposed on retailers. Assumptions are made regarding the additional physical inputs and working capital required to handle empty containers and regarding the costs of these inputs. An additional assumption made in the Report is that as sales volume declines, lost net revenue will be recouped by increased margins on the lower volume of trade. This seems an objectionable assumption, principally because it ignores the fact that reduced sales of soft drinks may well be offset by increased sales of other food products. The reduced sales volume is postulated to stem from the loss of convenience associated with the elimination of the can, not from an increase in the price of soft drinks. Hence, the Scott Report estimates based on the assumption of shopkeepers maintaining their net revenues are not accepted. Those estimates which are based on the assumption that the volume and mix of containers remain unchanged contain no element of lost revenue recoupment since revenue remains unchanged and hence, are valid estimates. The additional costs incurred by retailers amount to 0.57 cents per additional returnable container handled, for small traders, and 0.58 cents, for supermarkets and licensed outlets.

250. A study of the economic impact of compulsory deposit legislation in the state of Oregon [1] estimates that grocers' sorting and handling costs for returnable containers are approximately 1 cent (U.S.) per container. At the current exchange rate (August 1974) this is equivalent

[1] Charles M. Gudger and Jack C. Bailes, The Economic Impact of Oregon's Bottle Bill, (Oregon State University Press, 1974) (mimeographed).

to 0.67 cents. With a 90 percent return rate, the cost per container sold would amount to 0.6 cents.

251. These three estimates do not differ by very much. The cost to retailers of handling returnable instead of non-returnable containers would appear to be in the vicinity of half a cent per container.

Manufacturers' Costs

252. Estimates of the additional costs incurred by manufacturers in collecting and processing empty bottles and in operating bottling rather than canning plants, is from 1.14 to 2.18 cents per container.

253. According to the Oregon study cited above, the replacement of 93 million non-returnable containers per year by returnable bottles has affected soft drink bottlers' annual costs as follows:

		Cost per Container	
	US $	US ¢	Aust ¢
Increased warehouse labour	230,000	.25	.17
Increased truck driver labour	499,000	.54	.36
Increased space costs	152,000	.16	.11
Increased production labour costs	440,000	.47	.32
Total	1,321,000	1.42	.96

254. The Oregon figure is thus lower than the advisers' lowest estimate. Such a difference, if real, would indicate greater efficiency in distribution and processing in Oregon.

255. The figure of 2.5 cents, represents the net cost saving to manufacturers and retailers from using returnable rather than non-returnable containers and can be given with greater confidence than can estimates of the various components underlying this net figure. In so far as compulsory deposit legislation would lead to a switch from non-returnable to returnable containers, it is only necessary to know the net figure in order to calculate the net saving in resources used in the manufacturing and retailing sectors.

256. The estimate of the costs to retailers and manufacturers of collecting and processing returnable containers including any additional filling, storage and transport costs associated with returnables ranges from 1.6 to 2.64 cents per container. The cost of collecting and disposing of as scrap or as waste non-returnable containers would be less than

this: they would not have to be cleaned and none of the additional costs mentioned would be incurred. The advisers used the figure of 1 cent per container and regard this as being on the low side.

Household Sector

257. Consumers currently purchasing beverages in returnable containers would not be directly affected by a compulsory deposit scheme, if the deposit remained unchanged. They would be affected indirectly if the net price of beverages rose or fell as a result of the scheme. If the compulsory deposit were higher than the existing deposit they would be adversely affected through having extra funds in unrefunded deposits and increased losses through inadvertent failure to return containers.

258. Consumers who presently purchase beverages in non-returnable containers and discard the containers would have the choice, under a mandatory deposit scheme, of returning the containers and collecting the refunds or discarding the containers and forfeiting the refunds. Either way, they would be worse off. In this section an attempt to qunatify the cost imposed on such consumers is made.

259. Typically, soft drinks in non-returnable containers retail for 3 cents per container more than the net price (i.e. price without deposit) of a returnable container of similar size. [1] Consumers who pay this price premium must value the convenience of the non-returnable container at a minimum of 3 cents otherwise, like thousands of others (including themselves on other occasions), they would purchase returnable containers instead. The principal element of convenience is probably

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[1] Some recommended retail prices for small shopkeepers:

Schweppes Drinks

370 ml returnable bottle	17¢ + 5¢ deposit
370 ml ring-pull	20¢
370 ml standard can	19¢
750 ml returnable bottle	25¢ + 5¢ deposit
750 ml non-returnable bottle	28¢

Tarax Drinks

750 ml returnable bottle	25¢ + 4¢ deposit
750 ml non-returnable bottle	25¢
225 ml returnable bottle	12¢ + 2¢ deposit
225 ml ring-pull can	15¢

Source: The Milk Bar, December 1973 and June 1974.

the fact that the container does not have to be returned for a refund. However, cans in particular have other convenient attributes as well: they are lighter, less bulky, chill more quickly and, if of the ring-pull type, easy to open. Non-returnable bottles also have the first three of these qualities, though to a lesser degree. (The Committee noted that bottles may also have ring-pull tops).

260. If consumers are paying only for disposability, the 3 cent premium sets a lower limit to the cost of returning an empty container, as this cost is perceived by those who currently purchase non-returnable containers.

261. Under a mandatory deposit scheme, the purchaser of non-returnable containers will be forced to pay, initially, at least the gross price of a returnable container.[1] If he returns the container, the refund reduces the net price he pays to 3 cents less than the price he previously paid for non-returnable containers. If the disutility of returning the container is 3 cents, he breaks even: if 4 cents, he incurs a net cost of 1 cent; if 5 cents, he incurs a net cost of 2 cents; if greater than 5 cents, he discards the container, forfeiting the refund, and incurs a net cost of 2 cents, the difference between the gross price of a returnable container and the price of a non-returnable container.[2]

262. It can be concluded that, on the assumptions made above, present purchasers of cans and non-returnable bottles who switch to returnable bottles on the imposition of a 5 cent deposit on all containers will incur net costs of from zero to 2 cents per container. It is important to note that for those who return the container this net cost is composed of two elements: first, a gross cost related to the disutility of returning the container, ranging from 3 to 5 cents, and second, a price reduction for the container contents of 3 cents. The disutility is a real cost, consisting of the inconvenience of having to store, handle

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[1] If non-returnable containers remain on the market, carrying the uniform mandatory deposit, this price will presumably exceed that of a returnable container. The consumer may continue to purchase this type of container if he values sufficiently highly its qualities other than its disposability.

[2] A similar analysis can be carried out for higher deposits. For example, if the deposit were 10 cents, all consumers for whom the perceived cost of returning the container was less than 10 cents would return the container, gaining the 3 cent net price advantage and incurring costs ranging from zero to 7 cents per container.

and transport empty containers and conduct refund transactions. It is just as real as the similar money costs incurred by retailers and manufacturers in processing empty containers.

263. If we do not assume that consumers value only the disposability of cans and make allowance for the convenience element as well, the maximum disutility imposed on consumers who switch to returnable bottles and return them is 8 cents, giving a net loss of 5 cents after allowing for the 3 cent price reduction. Those who switch but discard the returnable containers may also be up to 5 cents worse off, losing 2 cents in the form of money costs and 3 cents worth of lost convenience. If cans remain on the market, consumers who value their convenience by more than 3 cents will continue to buy them and will incur net losses, either in terms of money or utility of up to 5 cents. If cans are not available on the market, this latter category of consumer could incur higher net losses.

264. Thus, some previous consumers of cans would not be affected while others would be up to 5 cents worse off, as a result of compulsory deposit legislation.

265. When a consumer switches from cans to bottles and saves 3 cents in money terms, he loses at least 3 cents in disutility. The 3 cent money gain comes ultimately from the savings in resource costs made possible by his switch of containers.

266. When a consumer makes a money loss through failing to collect his refund, the uncollected refund is the beverage manufacturer's gain. Ultimately, this gain would probably be passed on to consumers as a group. But whatever happens, the deposit forfeiter's loss is someone else's gain, so there is no net cost.

267. It follows that all consumers' money gains and losses resulting from the deposit legislation can be disregarded, either because they reflect real savings already counted, or because they represent transfer payments, not real costs. Hence, the only real costs arising from consumers' reactions to compulsory deposit legislation are the disutilities associated with bottle return and loss of the convenience of the can.

268. If the consumer assesses the probability of his collecting the refund as 0.9 which corresponds with the assumption that 90 percent of bottles are returned, then the expected money cost saving through buying bottles rather than cans is 2.5 cents.

269. The loss of utility experienced by a consumer who continues to purchase cans and returns them ranges from zero to 5 cents or to 4.5 cents if 90 percent of cans are returned: a figure of 1.8 cents per container for these consumers would be a reasonable estimate.

Major Costs for Soft Drinks

270. Whenever a non-returnable container is replaced by a returnable container subject to a deposit, there is a net saving in resource use in the manufacturing and distribution sectors of the economy taken together. This net effect is the result of a release of resources from container manufacture and an inflow of resources into retailing and into used-container processing by beverage manufacturers. The net effect is a saving in resources of about 2.5 cents.

271. At the same time consumers give up a container, the disposability and convenience of which they value at a minimum of 2.8 cents as indicated by their present choices. While it is impossible to quantify precisely the cost of effort involved in returning empty bottles and collecting refunds or the value of the convenience lost, it is not unreasonable to suggest that they may amount to 3.6 cents per container. The resource savings in the market sector, give a net cost of 1.1 cents per container.

272. If non-returnable containers continued to be used when subject to a deposit, the cost is much higher. There would be no resource savings in container manufacture, but additional resources worth probably at least 1 cent would be required in container collection by retailers and manufacturers. Consumers would not lose the convenience of the can but would incur the disutility of returning cans and collecting refunds. A low estimate of the cost to consumers is 2 cents per container, a figure which reduces to 1.8 cents when allowance is made for a 90 percent return rate. This gives a total cost of about 2.8 cents per container.

273. There are some minor offsets to these costs. Each switch from non-returnable to returnable container means some saving in waste disposal costs. However, since overhead costs in waste disposal are high and marginal costs low, this saving would probably be small. The double-handling of non-returnable containers subject to a deposit might result in more scrap metal and glass being reclaimed for recycling but again the value of this benefit is likely to be low.

274. Total sales of soft drinks in non-returnable containers in 1973-74 is projected at 1,111 million by the Scott Report. If all of these were replaced by sales in returnable bottles, costs and out-put in container manufacture would fall by a figure between $45.5 m. and $57 m.; additional costs of $5 m. would be incurred by retailers and from $12.7 m. to $25.2 m. by soft drink manufacturers in handling and processing empty containers. There would therefore be a net saving in the market sector of $27.8 m. Increased effort and inconvenience experienced by consumers might be valued at $40 m. The net cost might therefore be of the order of $12.2 m.

275. If the container mix stayed unchanged, but all containers were subject to a deposit, additional costs incurred by retailers and beverage manufacturers might amount to $11.1 m. and by consumers, $20 m., giving a total cost of $31.1 m.

276. If, for example, two-thirds of non-returnable containers were replaced by returnables and total sales in all containers remained constant, the total cost would be $18.5 m.

277. If, when container switching takes place, the market sector's lower costs are passed on to consumers, the latter's disutility and inconvenience costs are partially offset by lower beverage prices and the whole net cost is borne by consumers. If less than the whole saving in the market sector is passed on, then the market sector benefits from the scheme, while consumers bear more than the net costs of the scheme.

278. If as a result of the loss of convenience, total beverage sales decline, additional resources would be released from the market sector and this would represent a saving. However, consumers would be drinking fewer beverages and be worse off as a result. The two effects nearly cancel out but there would be some slight additional cost.

279. A compulsory deposit scheme, in so far as it results in the substitution of returnable for non-returnable containers, saves material resources at the expense of rather extensive use of labour resources, in both the market and household sectors and would reduce the volume of litter.

Beer

280. Packaging policies of brewers differ from those of soft drink manufacturers in several respects:

(a) returnable bottles do not carry an explicit deposit;

(b) returnable bottles are returned via the specialist-collector system, not, in general by back-haulage from retail outlets;

(c) consumers of beer in 13 oz. containers do not have a choice between lower-priced returnable containers and higher-priced non-returnable containers, although one brewer markets beer in returnable 13 oz. bottles of a price identical to that of 13 oz. cans.

281. Although empty beer bottles command a small price when collected from the home or delivered to bottle merchants, it is reasonable to assume that most consumers regard empty beer bottles as a nuisance to be disposed of rather than as a commodity of value. Most consumers therefore respond to the gross price of bottled beer, not the net price after deduction of the salvage value of the bottle.

282. The percentage mix by gallonage of packaged beer sales at the present time is approximately as follows: [1]

	Percent
26 oz. bottles	66.0
26 oz. cans	2.6
13 oz. bottles	7.4
13 oz. cans	24.0

283. The Oregon legislation specifies a lower deposit for beer containers than for soft drink containers. The Scott Report assumes that a 1 cent deposit would be charged for beer containers and a 5 cent deposit for soft drink containers - although the rationale for this difference is not obvious.

284. It is not certain that, with the advent of compulsory deposits, the specialist-collector system would continue to operate for beer containers or be replaced by direct collection of empty containers by the brewer from retail outlets. A substantial deposit is more likely to lead to the latter outcome.

285. If there was an imposition of a 5 cent deposit on all containers and the establishment of a collection system through retail outlets, beer pricing and container collection would take on the essential features

[1] Calculated from Table A4.4, Scott Report.

presently or assumed to become characteristic of soft drinks. The logical results would be: (i) brewers would market beer in 13 oz. returnable bottles; (ii) non-returnable bottles would be phased out; and (iii) cans, if they remained on the market, would sell for a price premium reflecting their higher costs as compared with returnable bottles.

286. These assumptions would result in savings in container cost resulting from the replacement of cans by returnable bottles of 2.5 cents per can replaced. The estimate of the costs incurred by retailers and beverage manufacturers in handling returned cans of about 1 cent per can would also be applied to beer.

287. However, unlike soft drink consumers, consumers of beer in 13 oz. packages do not at present have a choice between non-returnable and returnable containers since only the former are available. Introduction of the latter would widen their range of choice and in this respect they would benefit from the enactment of compulsory deposit legislation. On the other hand, those who would opt to buy cans or non-returnable bottles even if returnable bottles were presently available would be made worse off by being forced either to return containers or forfeit their deposits.

288. In the case of the soft drink market, at present about one-sixth (16.67 percent) of soft drink sales are in small (13 oz. or less) returnable bottles. It is assumed that returnable containers would have a similar share of the beer market if they were available. This assumption may overestimate the proportion of beer consumers who would prefer returnable bottles; beer purchasers are exclusively adults, whereas a substantial porportion of soft drinks is purchased by children and the disutility of effort expended in returning bottles is likely to be higher for adults than for children.

289. Persons who would choose returnable bottles at a 3 cent net price discount as compared to cans must value the disutility of returning bottles at less than 3 cents. It is assumed the average value of the disutility is 1.5 cents and that the average value of the disutility incurred by those who switch to returnable bottles only because of the duress imposed by the compulsory deposit is 4 cents. The average disutility cost involved in the switch from a can to a returnable bottle can be given as 3.575 cents. If only 90 percent of bottles were returned, the average disutility costs would be reduced to 3.218 cents.

290. Measured against the 2.5 cents worth of resources saved in container costs, there is a net loss of 0.718 cents per can replaced by a returnable bottle.

291. If cans continued to be purchased, it is estimated their collection costs would be, as in the case of soft drinks, 1 cent incurred by retailers and manufacturers, plus an average disutility cost to consumers of 1.8 cents, giving a total cost of 2.8 cents.

292. These conclusions apply only to 13 oz. containers. Large (26 oz.) cans account for a very small proportion (2.6 percent) of packaged beer sales. If these were replaced by returnable bottles, the analysis already made for soft drinks would probably apply. The predominant beer container is the 26 oz. returnable bottle which accounts for 66 percent of packaged beer sales. These bottles are currently retrieved by specialist-collectors. If this method of retrieval were replaced by recovery via retailers in exchange for deposit refunds, there would be several consequences:

(i) trippage rates would presumably increase. This would reduce the container cost per bottle sold;

(ii) costs currently incurred by specialist-collectors would be saved;

(iii) collection costs would be incurred by retailers and brewers; and

(iv) consumers would suffer the disutility of returning empty bottles to retailers.

293. Specialist-collectors apparently supply collected and washed beer bottles for 15 cents per dozen or 1.25 cents each.[1] The additional collecting, processing and other costs (except container costs proper) associated with returnable as compared with non-returnable containers is estimated at 1.6 to 2.64 cents per container. This estimate is not directly comparable with the specialist-collector cost, since it includes any additional filling, warehousing and transportation costs associated with the use of bottles rather than cans. Hence, we have no firm basis for deciding whether average cost per container is likely to be higher or lower with collection by breweries through retailers or by specialist-collectors. Assuming a cost of 1.25 cents per bottle under either

[1] Scott Report, p.10.

collection system,[1] the effect of an increase in trippage rates from 6 to 10 on container costs would then be as follows:

Costs per 100 fillings:

Item	Return Rate (Trippage) 83.3% (6)	90% (10)
New bottles	16.67 @ 7.83¢ = 130.52¢	10 @ 7.83¢ = 78.3¢
Collection	83.3 @ 1.25¢ = 104.14¢	90 @ 1.25¢ = 112.5¢
Total cost	234.68¢	190.8¢
Total cost per filling	2.35¢	1.91¢

294. Thus, the higher trippage rates achievable by means of a deposit refund system could reduce container costs by 0.44 cents per 26 oz. bottle.

295. Consumers who returned beer bottles for deposit refunds would incur a disutility cost of up to 5 cents. If 2.5 cents is given as an estimate of the average cost of the disutility of effort in returning a beer bottle and if 90 percent of bottles are returned, the average disutility cost per container sold is 2.25 cents.

296. Estimates of the total costs of compulsory deposit legislation applying to beer containers therefore can be given:

(i) Assuming that all cans and non-returnable bottles are replaced by returnable bottles.

(a) 13 oz. cans and non-returnable bottles -	Per Container Replaced	
Resource saving in market sector	2.5¢	
Disutility imposed on consumers	3.218¢	
Net cost	.718¢	
Estimated number of 13 oz. containers sold, 1973-74	802.8	million
Total Cost	$ 5.764	million

[1] It is unfortunate that it seems impossible, from the information available to make judgments about the relative costs of the two collection methods, since a substantial difference in their costs could significantly affect the total cost of the compulsory deposit scheme.

(b) 26 oz. cans -

	Per Can Replaced	
Resource saving in market sector	2.5¢	
Disutility imposed on consumers	3.6¢	
Net cost	1.1¢	
Estimated number of cans sold, 1973-74	34.2	million
Total Cost	$ 0.376	million

(c) 26 oz. bottles (Deposit system replacing specialist-collection)

	Per Bottle	
Resource saving in market sector	0.44¢	
Disutility imposed on consumers	2.25¢	
Net cost	1.81¢	
Estimated number of bottles sold, 1973-74	842.4	million
Total Cost	$ 15.247	million
Grand Total Cost	$ 21.387	million

(ii) Assuming that cans and non-returnable bottles are not replaced.

(a) All disposable containers -

	Per Container	
Collection costs borne by retailers and brewers	1.0¢	
Disutility imposed on consumers	1.8¢	
Total Cost	2.8¢	
Estimated number of non-returnable containers sold, 1973-74	837	million
Total Cost	$ 23.436	million

(b) 26 oz. bottles -

Total Cost (as above)	$ 21.387	million
Grand Total Cost	$ 44.823	million

297. The effect of a deposit scheme on soft drink consumers and producers is different to the way a compulsory deposit scheme would affect beer producers and consumers.

298. The consumer costs resulting from a switch-over from 13 oz. cans to returnable bottles would, on average, be smaller for beer than for soft drinks: this is because some consumers would gain from being able to choose returnable bottles - a choice not currently available.

299. With 26 oz. bottles, compulsory deposit legislation would alter the method of collection rather than the type of container. The savings in container costs made by replacing the specialist-collector system by the deposit refund system would be small relative to the costs of inconvenience imposed upon consumers. The specialist-collector system achieves reasonable economy in the use of containers at low cost; the much higher costs involved in the deposit-refund system are not justified by the additional savings in container cost, nor does it seem likely that they would be justified by litter reduction benefits.

CONCLUSIONS

300. The Committee concludes that a study of problems associated with the disposal of beverage containers in isolation from packaging and solid waste generally is unsatisfactory. We are conscious, however, that the reference given the Committee by the Minister for the Environment and Conservation reflected the wishes of the Australian Environment Council and that the environmental impact of beverage containers, while only part of a wider problem, raises a number of specific issues.

301. Non-returnable beverage containers for beer and soft drinks comprise a highly visible, readily identifiable and growing proportion of litter.

302. The cost to the consumer of beverages currently marketed in non-returnable containers is generally 3 cents above the cost of the same beverage sold in a returnable deposit-bearing container if the deposit is redeemed.

303. Until recently, the returnable glass bottle was the normal type of container for beer, carbonated soft drinks and milk. The packaging industry increasingly has replaced these containers with non-returnable cans and bottles. This process has involved the demise of local bottling and brewing firms and the increasing consolidation of beverage manufacture in the hands of national brand manufacturers. Encouragement to this trend has been given by heavy advertising and promotion and by the increasing development within the community of demands for 'convenience' packaging.

304. The costs to the community of this convenience are summarised as higher costs to the consumer for the actual beverage contents of non-returnable containers; a high and growing component of beverage containers in litter; avoidable use of scarce resources in the manufacture of containers for which an alternative reusable product is available and exacerbation of the growing problems of solid waste disposal.

305. The beverage container component of litter is the issue which has created the greatest public concern and comment. The scale of the problem can be illustrated by the fact that of the 3,491 million beverage containers (bottles and cans) filled in 1972-73, it is estimated that 2.6 percent or some 91.1 million items were littered.

306. More significant in real terms is that the increasing burden of costs for litter collection and solid waste disposal falls largely on local government authorities and ultimately on ratepayers.

307. The Committee rejected the proposal that a small tax should be imposed on all non-returnable beverage containers with the funds collected being used to finance litter collection and to improve enforcement, education and equipment. This measure would not directly affect the level of litter created by beverage containers but would act to alleviate the problem once it has occurred.

308. The Committee concludes that imposition of a substantial tax on beverage containers not carrying a deposit would have the effect of discouraging their use by increasing the cost differential between the contents of containers not carrying a deposit and those carrying a deposit.

309. Manufacturers of all non-deposit-bearing beverage containers could be expected to react by imposing a deposit on such containers and littering of them would be discouraged by the monetary motive for their return. In addition, there would be an incentive for others to collect discarded deposit-bearing containers.

310. The tax raised on non-deposit-bearing containers would be channelled through local government and other bodies responsible for litter collection and waste disposal and to finance other anti-litter measures such as public education programs, enforcement of litter laws and the provision of litter bins and collection facilities.

311. A tax system combined with deposits for beverage containers used for beer and soft drinks would have the following results:

(a) considerably reduce the beverage container component of litter;

(b) achieve substantial savings in the use of resources currently employed in the manufacture of non-returnable beverage containers;

(c) contribute to a significant extent to the reduction of the total volume of solid waste;

(d) reduce the costs of litter collection;

(e) produce a monetary incentive for the collection of littered deposit-bearing beverage containers;

(f) provide funds for the collection of littered containers;

(g) create greater awareness of the desirability of conserving finite resources and encourage the development of a community philosophy directed to this end;

(h) reduce other forms of litter as a secondary impact since litter is known to encourage further littering;

(i) provide an equitable contribution to the beverage container litter problem since litterers would forfeit their deposits or pay a tax to be used for the collection of litter;

(j) consumers would enjoy lower net prices for beverages assuming a tax and deposit scheme led to a move away from non-returnable containers.

312. Special factors exist in the case of 740 ml glass beer bottles which already have a very high rate of return without a deposit through an efficiently organised and long-standing scheme operated by marine dealers. In the interests of uniformity and to ensure continued re-use of this type of container, we believe that the same conditions should apply as to other beverage containers.

313. There are difficulties associated with placing a deposit on an item such as a steel or aluminium can which is greater than its inherent value and for that reason the Committee rejected a uniform deposit on all containers as an unsuitable solution.

314. It is desirable in the Australian context for an optional tax/deposit scheme to involve to the maximum extent existing marine dealers who have the organisational structure to operate a system of direct purchase of deposit-bearing containers from the public and retail outlets.

315. The Committee expresses concern at the expanding use of plastic and coated cardboard containers for beverages and milk and the resultant litter and waste disposal problems. It will give greater consideration to this trend in a succeeding report dealing with solid waste management generally.

316. The Committee places on record its appreciation of the significant contribution to its work and dedication of the former Clerk to the Committee, Mr T.J.P. Richmond, during this and earlier Inquiries.

December 1974

H.A. JENKINS
Chairman