

Additional Information on Beverage Container Legislation

State Beverage Container Laws and Ordinances

Seven States have enacted mandatory beverage container deposit legislation: Connecticut, Delaware, Iowa, Maine, Michigan, Oregon, and Vermont. * Oregon and Vermont's legislation took effect on October 1, 1971, and September 1, 1973, respectively. (Vermont added several amendments to its original legislation which took effect July 1, 1975.) Laws in Maine and Michigan took effect in 1978, while Iowa and Connecticut will follow in 1979 and 1980. Delaware's law will become effective on July 11, 1979, or 60 days after Maryland and Pennsylvania pass similar legislation, whichever is later. South Dakota has passed a beverage container packaging law specifying that all beverage containers sold in the State subsequent to July 1, 1978, must be reusable, recyclable, or biodegradable. Virginia passed a law in 1978 that prohibited further adoption of deposit laws by local governments in the State.

While the objectives of each of these laws, except Virginia's are similar—to create incentives for manufacturers, distributors, retailers, and consumers of beverage containers to reuse or recycle them, the particular provisions of each law differ substantially. Table D-1 shows the major provisions of each law and illustrates the differences among them. Refund values vary from 2 cents for certified containers up to 10 cents for uncertified bottles; some States require special la-

*Referenda that would have placed mandatory deposits on beverage containers were defeated in the 1976 elections in Colorado and Massachusetts and in 1978 in Nebraska and Alaska.

beling; and all these States, ban flip tops.** Connecticut's law includes a provision to provide compensation for up to 2 years for an employee dislocated as a result of any provision of the Act.

A Comparison and Analysis of Beverage Container Legislation Studies by Research Triangle Institute and The Wharton School

In the last several years a number of analytical studies have appeared on the impacts and effectiveness of beverage container legislation, such as mandatory deposits or bans on nonreturnable containers. This appendix is a comparison of two major studies:

1. Energy and Economic Impacts of Mandatory Deposits prepared for the Federal Energy Administration (FEA) by Research Triangle Institute (RTI) and Franklin Associates Limited (FAL), September 1976.(1).
2. A Study of the Impacts on the U.S.A. of a Ban on One-Way Beverage Containers prepared for the U.S. Brewers Association (USBA) by the Wharton School and the Department of Civil Engineering of the University of Pennsylvania, December 1976.(2).

The purpose of this appendix is to compare the scope, assumptions, methods, and findings of these two studies in order to identify

**Flip tops or pull-tabs are also banned in California, Hawaii, Massachusetts, Minnesota, South Carolina, and Virginia.

Table D-1.—Characteristics of State Beverage Container Deposit Laws

Characteristics	States which have enacted mandatory beverage container deposit laws						
	Connecticut	Delaware	Iowa	Maine	Michigan	Oregon	Vermont
Status of law	Enacted	Enacted	Enacted	Enacted referendum	Enacted Referendum	Enacted	Enacted 4/10/72 Amended 4/30/75
Effective date	1/1 /80	7/1 1/79 or 60 day: after Maryland and Pennsylvania enact similar legislation which ever is later	/1 '79 for all but liquor provisions /1/79 for liquor provision	/1/78	11/1/78	1 0/1/71	Original Act 9/1/73 Amended 7/1/75
Refund amount	5 or more	5 or more	5 or more	5 or more	5c or more' 10\$ or more	2c or more' 5c or more	5 or more
Handling fee paid by distributor to dealer	1 or more	20%. of refund	Limit to 113 max - num handling	1 or more			20%. of refund
Types of beverages covered	Beer Malt beverages Mineral water Soda water Carbonated soft drinks	Beer Malt beverages Ale Mineral water Carbonated soft drinks	Beer Malt beverages Mineral water Soda water Carbonated soft drinks	Beer Ale Soda water Carbonated soft drinks	Beer, ale Soda water Mineral water Carbonated soft drinks Malt beverages	Beer Malt beverages Mineral water Soda water Carbonated soft drinks	Beer Malt beverages Mineral water Carbonated soft drinks
Refund value must be clearly marked on container?	Yes, embossed, stamped, or labeled	Yes on label or 01 top of container. 1/4.inch type re fillable bottles exempt	es except for those which are already labeled otherwise	es	Yes, embossed, stamped, or on label	Yes, embossed, stamped, or on label	Yes, on label Refillable bottles exempt
State name must be clearly marked on container?	Yes, 1/2 inch type Embossed, stamped or labeled	Nonrefillable glass containers	10, but expect Department which is administering Act to eventually print on container	10	Yes, embossed, stamped, or on label	No	Yes, on label in 1/2 inch type, re fillable bottles exempt
Type of containers banned if any?	—	Yes if not biodegradable or photodegradable			—	—	Non biodegradable Glass nonreturnable containers
Flip tops banned?	Yes		es	es	Yes	Yes	Yes
Plastic 6-pack rings banned?	No		o	es	No	No	Yes
Who must accept returned containers	Dealer, Distributor	Dealer Distributor	Dealer, Distributor	Dealer, Distributor	Dealer, Distributor	Dealer, Distributor	Dealer, Distributor
Allowable reasons for refusal to accept returned containers?	Labeling not correct, if redemption center in area, damaged/dirty	If redemption center in area, bottle damaged, or unclear, more than 120 being re. turned within a 1. week period	bottle amaged	redemption center in area	If refund value and State name are not on bottle	Refund value not stated; redemption center in area	Labeling incorrect Size/brand; jamaged/dirty
Are redemption centers permitted?	Yes	Yes	Yes	es	Yes	Yes	(es
Penalty for noncompliance	—	21 VII penalty \$250 to \$1,000 and/or an injunction or restraining order	Misdemeanor	Civil penalty 100	Fine not less than \$100 nor more than \$1 ,00(Both civil and criminal penalties: depending on in. fraction	Fine \$1,000 per violation

'Lower deposit provided for certified standard bottles that can be used by a number of firms

areas of agreement and disagreement and to show the origins of any disagreement between them.

Background of Analyses of Beverage Container Legislation

The proponents of container legislation usually suggest one or more of the following goals as the motivation their proposals:

1. reduced litter
2. reduced solid waste
3. energy conservation
4. materials conservation
5. strengthening of the conservation ethic

These goals are the primary objects of analyses of the effectiveness of various proposals.

In addition to the intended goals, it is realized that container legislation would have a number of other impacts. While quite a few such impacts have been discussed, the following have been given the most attention:

1. employment
2. capital investment
3. profits
4. beverage sales
5. consumer costs
6. air and water pollution

No one currently knows how to predict the complete response of the economy to container legislation from first principles, or with any certainty. Therefore, most studies are "partially parametric," in the sense that one or more of the following factors are treated as parameters whose values partially determine the system response:

1. trippage or return rate for each beverage and container type
2. market shares for each container type and material
3. litter rate
4. recycling rate for disposed containers

At the current state of the art, predicting the values of these parameters is largely judgmental. Once the values of the parameters are chosen and assumptions made about future technology, it becomes largely

an engineering accounting task based on material and energy balances to estimate the effectiveness of container legislation in reaching its primary goals, as well as its impact on air and water pollution. In addition, economic models of different degrees of sophistication are used to supplement the parametric analysis in order to estimate the impacts on employment, investment, profits, costs and prices, and sales.

Family Tree of Existing Analyses

Three main streams of analytical work on beverage container legislation can be identified:

1. A series of reports done for the Environmental Protection Agency (EPA) and FEA by RTI, Midwest Research Institute (MRI), and FAL, culminating in the September 1976 report by RTI.(1) (The principals of FAL were part of the MRI staff in this area. Further, a significant part of the report by RTI was subcontracted to FAL, particularly the energy impact study.)
2. Studies done for the USBA by R. S. Weinberg and Associates and by the Wharton School culminating in the December 1976 report by the Wharton School. The Wharton School has done work for Busch Breweries in the past, and Weinberg was the project officer for USBA on the Wharton study. Weinberg has done a series of reports and analyses of other reports for USBA.(3)
3. Several additional studies that have drawn heavily on the analyses of the RTI/MRI/FAL series. These include:
 - a. the OECD report (4)
 - b. the GAO report (5)
 - c. the Michigan report (6)
 - d. the EPA 4th Report to Congress chapter on deposit legislation (7)
 - e. the staff report of the Resource Conservation Committee (RCC).(8)

These studies often contribute additional insight or manipulate the data for specific

needs, but all are heavily dependent on the RTI/MRI/FAL series.

In addition to these three groups, there exist some early studies in the field, especially Hannon's,(9) as well as several studies which have examined the Oregon and Vermont experiences.(10, 11,12) The latter are often used in making estimates of parameter values to be used in nationwide models.

Scope, Assumptions, and Methods of the Research Triangle Institute and Wharton School Studies

The RTI study tries to answer the question, "What might happen if a mandatory beverage container deposit system were initiated in the late 1970's?"

The Wharton School study tries to answer the question, "What might have happened if nonreturnable containers had been banned and if a deposit system on the remaining refillable containers had been initiated during the period 1969 through 1974?"

Table D-2 compares the detailed scope, assumptions, and methods of the two studies. The Wharton School did a retrospective analysis of a hypothetical ban on nonreturnable containers. This approach reduced the number of assumptions to be made about costs, technology, sales, market shares, and return rates because the base case of no legislation could be taken to be the actual historical record. Their assumption of a ban on nonreturnables simplified the analysis since it included disappearance of all cans and nonreturnable bottles and required complete conversion of the industries involved to refillable glass. The Wharton economic analysis is based on a 'cost-plus' model of pricing in each industrial sector in which it is assumed that each industry maintains the same return on investment after the ban takes effect as before. Considerable effort was expended on estimating investment requirements. Finally, they use a sophisticated model of the complete U.S. economy to estimate secondary impacts of the ban.

The RTI and FAL performed a prospective analysis of a hypothetical deposit system mandated by Federal law in 1978. Forecasts are made of future beverage sales and future container technologies; the latter in terms of unit energy requirements and weights. The methodology allows for investigation of a full range of container market shares and return rates, but to simplify presentation of the results, two scenarios are selected to illustrate possible system behavior. The authors emphasize that the scenarios are neither most probable nor extremes and that users must evaluate their own scenarios to use the results effectively. Differences in capital stock for the no-deposit and with-deposit situations are evaluated based on the plant and equipment requirements to meet demand under the two conditions. The pricing model used assumes that cost changes are reflected directly in shelf price changes without mark-up. Increased handling costs tend to raise prices, while the scrap value of returned containers and the retained deposits tend to reduce prices. Analysis of secondary impacts was limited to changes in employment, employee earnings, and output of primary materials industries.

Neither study evaluated the impact of the laws on materials consumption, solid waste, air and water pollution, or the conservation ethic. Wharton presented a brief estimate of impacts on costs of litter control. Both presented final results in terms of plausible scenarios as follows:

Wharton School Standard Scenario
no cans or nonreturnable bottles
trippage = 8
no change in beverage demand

RTI Scenario I
no nonreturnable bottles
can sales equal to those for 1976
trippage = 10 for bottles (return rate 0.9)
recycle rate for cans = 0.9
small reduction in beverage demand

Table D-2.—Scope, Assumptions, and Methods of the Research Triangle Institute and The Wharton School Studies

Characteristic	Wharton School	Research Triangle Institute
Nature of study	Nonreturnable ban with supplementary deposit system	Mandatory deposits
Deposit level	Beer, 5cent soft drinks 6cent	5cent
Date legislation begins	1969	1978
Date legislation fully effective	1974	1982
Cans banned?	Yes	No
Nonreturnable bottles?	Banned	Disappear
Bottle return rates in final scenario(s)	0.875 (8 trips)	0.8 and 0.9 (5 and 10 trips)
Can return rate	Irrelevant	Same as bottle return rate
Technological change	None	All containers improve by 1982
What happens to returned cans?	Irrelevant	All recycled
Steel/aluminum market share for cans	Irrelevant	Same as projected without deposits
Refillable beer bottle type.	12 oz. export or 12 oz. stubby	11 oz. stubby
Pricing model	“Cost-plus,” dynamic	“Competitive,” static
What happens to un-claimed deposits?	Partially retained as income by brewers and bottlers	Reflected in lower consumer prices and in offsets of additional costs
Industry profits.	Return on investment assumed same for each sector with and without legislation	Not evaluated
Method of estimating higher order impacts on the economy	Complete simulation on Wharton model of the economy	Only done for primary material production

RTI Scenario II

- no nonreturnable bottles
- can sales equal to one-half of those for 1976
- trippage = 5 for bottles (return rate 0.8)
- recycle rate for cans = 0.8
- small reduction in beverage demand

Because these studies have such different scope, it is difficult to compare them. The major difference lies in the assumption by the Wharton School that nonreturnables are banned by legislation. This assumption creates large impacts on investment and allows Wharton to draw a number of qualitative conclusions about barriers to future technological development, loss of intercontainer competition, increased consumer inconvenience, and restricted freedom of choice which tend toward a very rigid, noncompet-

itive system. These findings arise, however, as a result of the ban, not as a result of a deposit requirement.

Comparison of Findings of the Research Triangle Institute and The Wharton School

Table D-3 compares the findings of the two studies for their final scenarios with regard to energy, beverage sales, employment and earnings, and investment. Because the two studies present results for time periods 8 years apart, the findings are compared on a normalized per-ounce of sales basis in table D-4. This mode of presentation is intended to correct for large shifts in the overall sizes of the industries from 1974 to 1982, Wharton School only provided a “no-ban” base case

Table D.3.—Findings of the Research Triangle Institute and The Wharton School Studies

Finding	Wharton a		RTI	
	Standard scenario 1974	Scenario I 1982	Scenario II 1982	
Total annual energy saving for beverage delivery	147 to 226 X 10 ¹² Btu	168 X 10 ¹² Btu	144 X 10 ¹² Btu	
Percentage annual energy savings for beverage delivery.....	36% to 56%	44?L0	38%	
Impact on employment in "core industries" ^b (jobs).....	+ 54,946 (export) + 48,154 (stubby) + 50,000 (nominal)	—	—	
Impact on employment in all industries (jobs) . . .	+ 133,000 (net) + 176,000 (gained) - 38,000 (lost)	+ 18,000 (net) + 56,000 (gained) - 38,000 (lost)	17,000 (net) 66,000 (gained) 49,000 (lost)	
Impact on investment in core industries (billion dollars).....	+ 4.1 C to 4.5d	+ 1.5e	+ 2.4e	
Net impact on employee earnings (million dollars/year).....	+ 559 to 648 ^f	+ 879	+ 936	
Annual beverage consumption (billion ounces) . .	1,139	1,890	1,890	

aTwo subscenarios were examined for cases in which brewers adopt export (traditional) or stubby returnable bottles

b core industries are brewers, wholesalers, bottlers, retailers, and can and bottle manufacturers

c Includes \$1.0 billion for additional returnable Container inventory Or "float."

d Includes \$1.1 billion for float.

^eDoes not include float

^fCore industries only

Table D-4.— Findings of the Research Triangle Institute and The Wharton School Studies Per Unit Beverage Consumption

Finding	Wharton		RTI	
	Standard scenario 1974	Scenario I 1982	Scenario II 1982	
Energy savings in beverage delivery (Btu/ounce)	129 to 198	88	76	
Net change in employment in all industries (jobs/billion ounces).....	+ 104	+ 62	+ 62	
Impact on investment in core industries (\$/1,000 ounce/year).....	+ 3.6 to 4.0	+ 0.8	+ 1.3	
Net impact on employee earnings (\$/million ounces).....	+ 491 to 569	+ 465	+ 495	

that would facilitate comparisons of the studies on a percent change basis for total system energy consumption.

The interesting thing about the findings reported in tables D-3 and D-4 is the agreement between the two studies on potential energy savings, on employment changes, and on net employee earnings increases. This agreement is most surprising in view of the different assumptions and study perspectives. Nevertheless, within the accuracy which can be hoped for from any such analysis, the two studies appear to agree, perhaps fortuitously, in the critical areas of energy, employment, and employee earnings.

The two studies disagree considerably on investment requirements. On a normalized basis, Wharton School projects greater additional investment expense by a factor of 3 to 6 (see table D-4.) the studies disagree for at least three reasons, the relative importance of which we have been unable to assess. First, the Wharton School assumption of a ban on nonreturnables necessitates a higher level of investment in bottle handling equipment. Second, Wharton School uses a 3-year phase-in period, while RTI's is longer (4 years). This allows a more orderly replacement of capital by RTI. Third, USBA (Weinberg) argues that RTI overestimates the degree to which existing equipment can be con-

verted and thus underestimates additional expense. In one sense, Wharton School should have underestimated capital needs, since in the 1969 base year the beverage system was less committed to nonreturnables than it was in the RTI base year of 1978. (See chapter 9 for further discussion of investment impacts of BCDL.)

Federal Experience With Beverage Container Deposits

On September 21, 1976, the EPA promulgated Federal guidelines dealing with beverage containers for carbonated beverages (soft drinks and beer).⁽¹³⁾ These guidelines require that a 5-cent deposit-refund system be established for all beer and soft drinks sold on Federal facilities, such as national parks and Federal agencies, unless such a system is determined to be infeasible for certain enumerated reasons. These guidelines, promulgated under authority in the Resource Recovery Act of 1970, which amended the Solid Waste Disposal Act of 1965, have a compliance deadline of September 21, 1977.

These guidelines have two primary goals: (1) a reduction in beverage container solid waste and litter; and (2) the conservation and more efficient use of energy and materials resources.

Approximately 20 Federal agencies have or are in the process of implementing a refillable beverage container deposit system in all or part of their properties (there are 27 Federal agencies to which these guidelines do not apply). See table D-5 for agencies implementing the guidelines.

Several Federal agencies have tested the implementation of such a deposit system. The results of two test programs—one by the Department of Defense on 10 military bases, and a second initiated by Yosemite Park and Curry Company with support of the National Park Service and the EPA at Yosemite National Park—are discussed here.

Table D-5.—Federal Agencies That Are Implementing or Have Implemented a Deposit Refund System

Civil Aeronautics Board
Commodity Futures Trading Commission
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy (some facilities will implement and some will not)
Department of Health, Education, and Welfare (in process of deciding which facilities will implement)
Department of Interior (in process of deciding which facilities will implement)
Department of Transportation (some facilities will implement and some will not)
Department of Treasury
Environmental Protection Agency (some facilities will implement and some will not)
Federal Deposit Insurance Corporation
Federal Reserve
General Services Administration
International Trade Commission
National Aeronautics and Space Administration
National Science Foundation (some facilities will implement and some will not)
Tennessee Valley Authority
Veterans Administration

SOURCE: (14)

Department of Defense Test

The Department of Defense (DOD), with the EPA's support, and a contractor, FAL, undertook a 1-year DOD Beverage Container Test program at 10 military installations. (15) The objectives of this test program were:

- To field test the EPA's guidelines for mandatory beverage container use,
- To determine the effect in a test situation of beverage container deposits on beverage container use and return patterns,
- To test the EPA guidelines at selected DOD facilities,
- To determine the costs and benefits at DOD facilities of implementing the EPA guidelines including measurable economic impacts and beverage container use and return patterns under a 5-cent deposit system, and

- To develop decision criteria for DOD on the implementation or nonimplementation of the EPA guidelines at military facilities.

The recommendations of the task force that ran the test program were that EPA guidelines for beverage containers should not be implemented fully or selectively on U.S. military bases. * However, refillable containers should be available in military sales outlets where economically feasible when competitive off-base outlets are not similarly restricted: the test results indicated an average dollar sales loss of 25.4 percent at the military installations when competitive off-base sales outlets were not operating under a deposit system. However, the task force stated that DOD installations will continue to actively implement State deposit laws in those States having such laws.

The recommendations of this task force are under review by the Deputy Assistant Secretary of Defense for Energy, Environment, and Safety. The final decision on how DOD will respond to EPA's Beverage Container Guidelines will be made by the Secretary of Defense.

Yosemite National Park Test

The Yosemite Park and Curry Company, with the support of the National Park Service and EPA, tested a 5-cent deposit on all beer and soft drink containers sold in Yosemite National Park.⁽¹⁶⁾ The system was implemented in May 1976 for a 4-month test period. After the test, it was decided that the deposit system should be established on a permanent basis. The findings of the 4-month test

period, May-August 1976, can be summarized as follows:

- Beverage sales and packaging mix. Two analyses were undertaken regarding the impacts of initiating a deposit system on beverage sales—one based on total sales and one on vending machine sales. Both analyses showed that the beverage sales were below the expected sales for 1976. However, a number of reasons, other than the initiation of a deposit system, may have affected the sale of beverages including the number of visitors to the park, weather, and beverage price increases.

Throughout the summer consumers continued to buy beverages in the available containers in the same proportions as they did before the deposit system (7-up and Shasta were removed from the market because they were packaged in bimetal cans. The reason for this action was the absence of an adequate market for recycled bimetal cans). Ninety-eight percent of beverage sales are in cans.

- Return rates for containers. Seven out of ten beverage containers sold in Yosemite were returned in the summer of 1976.
- Recycling, solid waste, and litter. Cans marked for a deposit refund were rarely found as litter in the park. During the summer approximately 30 tons of beverage containers were recycled. Overall, there was a solid waste reduction of 30 tons.
- Economics. The economics of the deposit system test were estimated by comparing the revenues (scrap value of the returned containers and the forfeited deposits on containers which are not returned) with the costs (handling, labeling, equipment and supplies, labor, etc.). It was estimated that for the summer the system broke about even. However, it was also estimated that for future summers, the system could anticipate a profit of about \$8,000.

*EPA representatives on the task force believed that it was both inappropriate and a conflict of interest to participate in a process directed toward the establishment of a policy on EPA's Beverage Container Guidelines. The EPA representative, therefore, did not participate in the development and final adoption of the task force's recommendations.

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