ECONOMIC IMPACT OF BEVERAGE CONTAINER DEPOSITS ON MUNICIPAL RECYCLING PROCESSING COSTS

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BACKGROUND

NWRA seeks to understand the impact of beverage container deposit systems (bottle bills) on municipal recycling processing costs. This presentation includes the result of modeling to predict the impact of bottle bills on MRF costs and revenues and presents policy options to mitigate those impacts.

SIX SCENARIOS EVALUATED

	BEVERAGES INCLUDED	DEPOSIT AMOUNT
Scenario 1	Beer & Carbonated Soft Drinks (CSD)	$0.05
Scenario 2	Beer & CSD	$0.10
Scenario 3	Beer, CSD & Water	$0.05
Scenario 4	Beer, CSD & Water	$0.10
Scenario 5	All beverages (excluding milk)	$0.05
Scenario 6	All beverages (excluding milk)	$0.10

Key Assumptions:

- Aluminum, Glass and PET beverage containers included
- $0.05 deposit yields 65 percent redemption rate; $0.10 yields 85 percent redemption rate

MRF COST & REVENUE IMPACTS

OVERVIEW OF MRF COST AND REVENUE IMPACTS OF BEVERAGE CONTAINER DEPOSITS

- MRF revenue is reduced due to loss of key commodities
- Fixed cost/ton is higher since fixed cost remain constant and is spread across fewer tons
  - Same equipment is required to process aluminum, PET and glass, even with less of each in system
- Variable cost savings result from fewer tons processed

RESIDENTIAL RECYCLING SYSTEM IMPACTS NEEDING FURTHER STUDY

- Impacts do exist and could be material
- No available data
- Quantification requires field study

Lower throughput due to lower density of post-deposit stream treated as neutral

1. Loss of heaviest material in curbside programs- glass
2. Impacts require more field data to identify but are likely present

Recycling collection impacts due to density changes (+-) not evaluated

1. Payload density may be reduced from loss of glass, requiring additional trucks
2. Loss of amount collected may reduce routes and trucks

MODEL ASSUMPTIONS FOR MRF COST AND REVENUE IMPACT

- U.S. average-sized MRF (93,600 TPY) serving a community of ~1.25M people
- Equipment run time and labor cost remain constant
  - Remaining PET, Glass and Aluminum flows must be sorted and QC'd
- Measurable direct variable cost savings were calculated for each material
  - Indirect impacts cannot be modeled without additional testing / measurement
- Revenue assumes 5-year average commodity value

DEPOSIT PROGRAM IMPACT ON BEVERAGE CONTAINER RECYCLING RATES

Material	Non-Deposit Scenario	Scenario 1 *Beer & CSD, $0.05*	Scenario 2 *Beer & CSD, $0.10*	Scenario 3 *Beer, CSD & Water, $0.05*	Scenario 4 *Beer, CSD & Water, $0.10*	Scenario 5 *All Beverage, $0.05*	Scenario 6 *All Beverage, $0.10*
PET Beverage Containers	29%	37%	40%	48%	54%	65%	77%
Glass Beverage Containers	25%	69%	78%	71%	81%	73%	83%
Aluminum Beverage Containers	50%	77%	89%	77%	89%	77%	89%

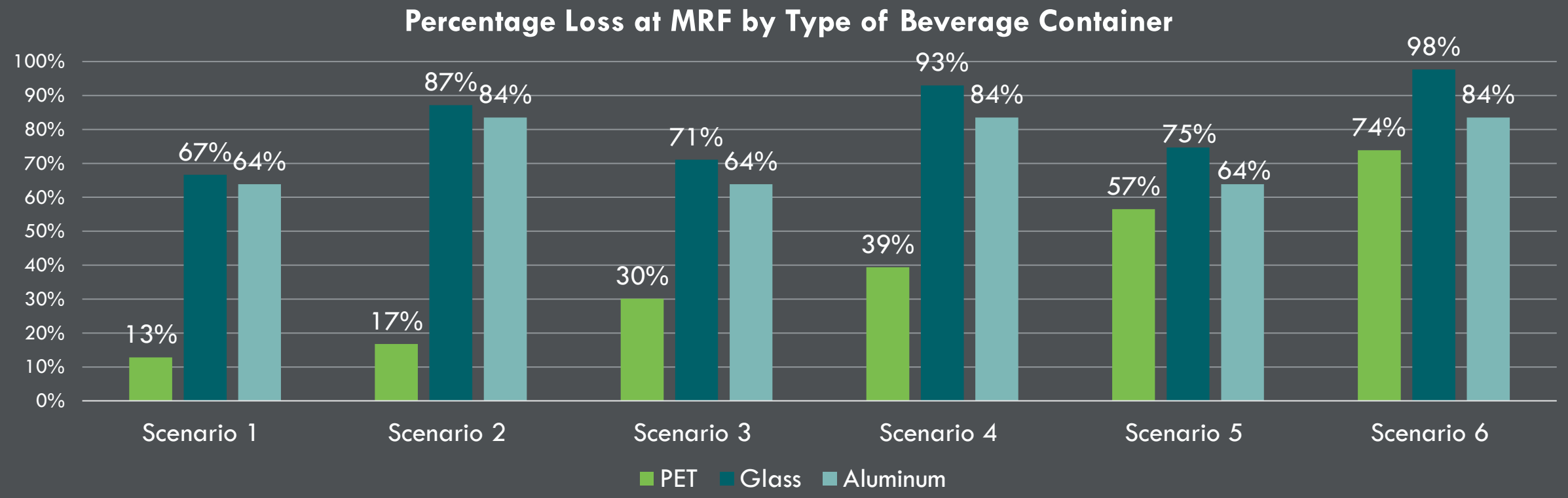
Recycling rates include both material recycled through MRFs and captured through deposit systems. Materials estimated to be removed from MRFs under deposit scenarios are presented on slides 11 and 12.

BLENDED VALUE REVENUE (ACR) FOR AVERAGE MRF TON

Material	Price/ton (Aug. 2021)	Price/ton (5 year avg.)	MRF Ton Composition	Scenario 1 *Beer & CSD, $0.05*	Scenario 2 *Beer & CSD, $0.10*	Scenario 3 *Beer, CSD & Water, $0.05*	Scenario 4 *Beer, CSD & Water, $0.10*	Scenario 5 *All Beverage, $0.05*	Scenario 6 *All Beverage, $0.10*
SRPN (Curb ONP)	$102	$49	5.1%	5.8%	6.1%	5.9%	6.2%	6.0%	6.3%
Mixed Paper	$85	$29	20.3%	23.2%	24.1%	23.6%	24.6%	24.0%	25.1%
OCC	$168	$91	23.3%	26.7%	27.7%	27.1%	28.2%	27.5%	28.8%
Glass (Tri-Mix) (Beverage)	**($24)**	**($22)**	**15.1%**	**5.0%**	**1.9%**	**4.4%**	**1.1%**	**3.8%**	**0.4%**
Glass (Tri-Mix) (Non-Beverage)	($24)	($22)	2.9%	3.4%	3.5%	3.4%	3.6%	3.5%	3.6%
Aluminum Cans (Beverage)	**$1,495**	**$1,193**	**1.5%**	**0.5%**	**0.2%**	**0.5%**	**0.2%**	**0.5%**	**0.2%**
Aluminum (Non-Beverage)	$1,495	$1,193	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Steel Cans	$250	$147	1.9%	2.2%	2.3%	2.2%	2.3%	2.2%	2.3%
PET (Beverage)	**$506**	**$257**	**3.9%**	**3.4%**	**3.2%**	**2.7%**	**2.4%**	**1.7%**	**1.0%**
PET (Non-Beverage)	$506	$257	1.3%	1.5%	1.5%	1.5%	1.6%	1.5%	1.6%
Natural HDPE	$2,164	$846	1.3%	1.5%	1.5%	1.5%	1.6%	1.5%	1.6%
Colored HDPE	$1,160	$331	1.8%	2.1%	2.1%	2.1%	2.2%	2.1%	2.2%
Mixed Plastics	$4	$7	2.8%	3.2%	3.3%	3.3%	3.4%	3.3%	3.5%
Carton/Aseptic	$3	$46	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Residue	($54)	($50)	18.0%	20.6%	21.4%	20.9%	21.8%	21.3%	22.3%
Total Value of MRF Ton (Aug. 2021)			**$ 156**	**$ 159**	**$ 159**	**$ 157**	**$ 158**	**$ 155**	**$ 154**
Total Value of MRF Ton (5-yr avg.)			**$ 73**	**$ 69**	**$ 68**	**$ 68**	**$ 67**	**$ 67**	**$ 65**

PERCENT OF BEVERAGE CONTAINERS MOVED FROM MRFS TO DEPOSITS

When a beverage container deposit system is implemented, material that was previously recycled at curbside will instead be redeemed for the deposit. The amount of each MRF beverage container stream that is redirected (from the MRF to the deposit system) in the modeled system is presented below.



TONS OF MATERIALS REMOVED FROM MODEL MRF (93,600 TPY)

When a beverage container deposit system is implemented, material that was previously recycled at curbside will instead be redeemed for the deposit. The amount of each MRF beverage container stream that is redirected (from the MRF to the deposit system) in the modeled system is presented below.

	Scenario 1 *Beer & CSD, $0.05*	**Scenario 2** *Beer & CSD, $0.10*	**Scenario 3** *Beer, CSD & Water, $0.05*	**Scenario 4** *Beer, CSD & Water, $0.10*	**Scenario 5** *All Beverage, $0.05*	**Scenario 6** *All Beverage, $0.10*
PET Beverage Containers	470	610	1,100	1,440	2,060	2,700
Glass Beverage Containers	9,400	12,290	10,020	13,110	10,520	13,760
Aluminum Beverage Containers	900	1,170	900	1,170	900	1,170
Total	**10,770**	**14,070**	**12,020**	**15,720**	**13,480**	**17,630**

IMPACT OF DEPOSITS ON MRF REVENUE (PER TON PROCESSED)

	Scenario 1 *Beer & CSD, $0.05*	**Scenario 2** *Beer & CSD, $0.10*	**Scenario 3** *Beer, CSD & Water, $0.05*	**Scenario 4** *Beer, CSD & Water, $0.10*	**Scenario 5** *All Beverage, $0.05*	**Scenario 6** *All Beverage, $0.10*
PET Beverage Containers	$ (1.50)	$ (2.00)	$ (3.50)	$ (4.80)	$ (6.60)	$ (9.10)
Glass Beverage Containers	$ 2.50	$ 3.40	$ 2.70	$ 3.70	$ 2.90	$ 4.00
Aluminum Beverage Containers	$ (12.90)	$ (17.60)	$ (13.10)	$ (18.00)	$ (13.40)	$ (18.40)
Revenue Loss ($ / ton)	**$ (11.90)**	**$ (16.20)**	**$ (13.90)**	**$ (19.10)**	**$ (17.10)**	**$ (23.50)**

IMPACT OF DEPOSITS ON FIXED MRF COSTS (PER TON PROCESSED)

	Scenario 1 *Beer & CSD, $0.05*	**Scenario 2** *Beer & CSD, $0.10*	**Scenario 3** *Beer, CSD & Water, $0.05*	**Scenario 4** *Beer, CSD & Water, $0.10*	**Scenario 5** *All Beverage, $0.05*	**Scenario 6** *All Beverage, $0.10*
Reduced Tonnage at MRF	10,770	14,070	12,020	15,720	13,480	17,630
Fixed Capital Cost Increase ($/ton)	**$ (8.50)**	**$ (11.60)**	**$ (9.60)**	**$ (13.20)**	**$ (11.00)**	**$ (15.20)**

Fixed MRF costs reflect the capital expenditure for a 93,600 ton per year facility utilized at a lower throughput in each of the deposit scenarios

IMPACT OF DEPOSIT SYSTEMS ON MRF VARIABLE COSTS (PER TON PROCESSED)

	Scenario 1 *Beer & CSD, $0.05*	**Scenario 2** *Beer & CSD, $0.10*	**Scenario 3** *Beer, CSD & Water, $0.05*	**Scenario 4** *Beer, CSD & Water, $0.10*	**Scenario 5** *All Beverage, $0.05*	**Scenario 6** *All Beverage, $0.10*
PET Beverage Containers	$ 1.60	$ 1.80	$ 2.40	$ 2.90	$ 3.60	$ 4.60
Glass Beverage Containers	$ 3.00	$ 3.80	$ 3.20	$ 4.00	$ 3.40	$ 4.20
Aluminum Beverage Containers	$ 0.90	$ 1.10	$ 0.90	$ 1.10	$ 0.90	$ 1.20
Variable Cost Savings ($/ton)	**$ 5.50**	**$ 6.70**	**$ 6.50**	**$ 8.00**	**$ 7.90**	**$ 10.00**

Variable cost savings reflect direct equipment and plant variables for each material (maintenance / utility) and reduced baler time

ESTIMATED IMPACT OF DEPOSITS ON MRF COSTS AND REVENUES

	Scenario 1 *Beer & CSD, $0.05*	**Scenario 2** *Beer & CSD, $0.10*	**Scenario 3** *Beer, CSD & Water, $0.05*	**Scenario 4** *Beer, CSD & Water, $0.10*	**Scenario 5** *All Beverage, $0.05*	**Scenario 6** *All Beverage, $0.10*
Commodity Revenues	$ (11.90)	$ (16.20)	$ (13.90)	$ (19.10)	$ (17.10)	$ (23.50)
Fixed Cost	$ (8.50)	$ (11.60)	$ (9.60)	$ (13.20)	$ (11.00)	$ (15.20)
Variable Costs	$ 5.50	$ 6.70	$ 6.50	$ 8.00	$ 7.90	$ 10.00
Net Impact / Ton	**$ (14.90)**	**$ (21.10)**	**$ (17.00)**	**$ (24.30)**	**$ (20.20)**	**$ (28.70)**
Tonnage Basis	82,830	79,530	81,580	77,880	80,120	75,970
Net Impact / MRF	**$ (1,234,000)**	**$ (1,676,300)**	**$ (1,394,300)**	**$ (1,885,900)**	**$ (1,625,900)**	**$ (2,188,700)**
Net Impact / HH / Year	**$ (2.50)**	**$ (3.50)**	**$ (3.00)**	**$ (4.00)**	**$ (3.50)**	**$ (4.50)**

Assumes MRF designed for 93,600 TPY (before deposit) serves community of ~1.25m people in 473,000 households

Note: Values may be slightly skewed due to rounding

SUMMARY OF CONTAINER DEPOSIT IMPACTS

RECYCLING PROGRAM IMPACTS

- Loss in throughput mass
- Less dense material left in stream
- Loss in high value commodity and processing fee revenue
- Savings in variable cost offsets some increase in fixed cost

MATERIAL REVENUE LOSS

- Largest measurable negative impact
- 5 yr. Avg - $12 to $24 / ton impact for model MRF
- Current Market $16 - $37 / ton impact for model MRF
- Impact to Avg. MRF - $985k - $1.8 M loss

SUMMARY

- Removing beverage containers:
  - Reduces MRF commodity revenue
  - Increases net costs per ton
- Density impacts need further evaluation

OTHER IMPACTS OF BEVERAGE CONTAINER DEPOSITS

- Disposal cost savings
  - Beverage container deposits remove materials from the waste stream; as a result, municipalities should see reduced waste disposal costs
- Reduction in litter and marine debris and related clean up costs
  - Studies have found fewer beverage containers littered in states / jurisdictions with beverage container deposits
- Higher value materials more likely to be circular
  - Materials collected through deposit programs typically yield a price premium over materials processed at MRFs, reflecting higher quality / lower contamination
  - Deposit program materials are more likely to be recycled into new beverage containers

POLICY OPTIONS TO MITIGATE ECONOMIC IMPACTS

BACKGROUND

- Most beverage container deposit programs were enacted in 1980s, predating widespread curbside recycling
- Recent debates on new beverage container deposit laws or deposit expansion focused on impact these policies have on funding for municipal recycling programs and MRFs
- Policy can be structured to capture the benefits of beverage container deposits – high recycling rates for target materials, and materials more suited for closed loop applications – while ensuring that municipal recycling programs are not harmed
- California CRV program compensates MRFs for materials handled; although program has seen significant challenges

POLICY OPTION: COMPENSATE MUNICIPALITIES FOR REDUCED REVENUES

Legislation could require that municipalities be reimbursed for lost revenue that results from the implementation/expansion of deposit programs

- Payment could be made by distributors, or, in states where the state captures unclaimed deposits, the state
- Policy should require that the reimbursed funds be used to support recycling programs

Potential Methodologies for Reimbursement Include:

- Formulaic reimbursements:
  - Utilize redemption rate in a municipality's service area
  - Use assumption* of the proportion of redeemed material placed in municipal recycling program
- Documented reimbursement using the following data:
  - Establish a baseline by documenting the amount of each beverage container commodity sold, and the revenue received, for one year prior to implementation
  - Report quarterly on the amount of each beverage container commodity sold
  - Compare quarterly reports to relevant baseline quarter to determine amount of material lost to deposit system
  - Utilize published commodity indices to determine the value of the material

POLICY OPTION: COMPENSATE MRFS FOR BEVERAGE CONTAINERS HANDLED

Legislation could require that MRFs be paid the deposit value and/or a handling fee for the beverage containers residents place in the municipal recycling system

- Payment could be made by distributors, or, in states where the state captures unclaimed deposits, the state may use a formula to disburse to MRFs directly
- Small MRFs could sort beverage containers to redeem deposits; this occurs under current deposit schemes where small MRFs work with distributors / redemption centers
- Larger MRFs could be compensated based on the results of periodic third-party audits of commodity bales to determine the amount of beverage containers handled, similar to the protocol in California's CRV program

POLICY OPTION: REQUIRE BEVERAGE CONTAINER DISTRIBUTORS TO INVEST IN ADDITIONAL RECYCLING

Policy could require that beverage container distributors work collaboratively* to make investments to improve beverage container recycling, including:

- Away from home collection systems
- MRF technology improvements (e.g., quality control to capture misdirected UBCs or lightweight PET bottles)

**Collaborative model could be based on the Oregon Beverage Recycling Cooperative or other producer responsibility organizations*

POLICY OPTION: IMPLEMENT BEVERAGE CONTAINER DEPOSITS IN CONCERT WITH EXTENDED PRODUCER RESPONSIBILITY

Extended producer responsibility for packaging and printed paper (EPR for PPP) transfers commodity risk to brands and retailers (represented by a producer responsibility organization (PRO)

- In an EPR for PPP system, municipalities no longer financially responsible for MRF processing costs and do not rely on MRF revenues to offset costs (though they may contract for services and be reimbursed)
- EPR for PPP and beverage container deposits coexist in many jurisdictions including Quebec and British Columbia in Canada, Belgium and Germany in Europe, and soon to be in Oregon and Maine

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