Monitoring & Measuring Program Impacts

Alec Scott, CIF

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Why Measure & Monitor?

Why?

- Measure actual performance
- Identify problems & their causes
- Assess compliance
- Rethink the “obvious”

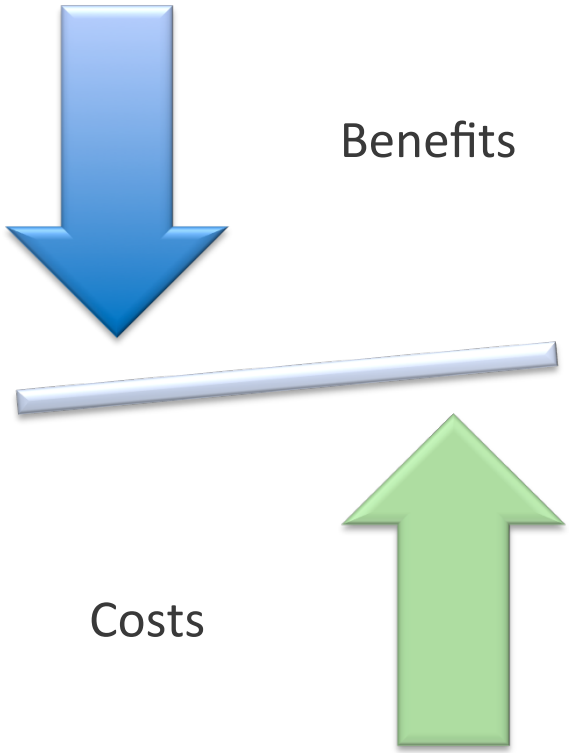
How?

- Identify key characteristics or indicators
- Develop a baseline
- Identify goals & objectives
- Track performance against baseline & goals
- Check your technique – are you actually measuring what you think you’re measuring?

Re-Thinking Old Ideas

- New Technology
- New Materials
- New Ideas

- Are we getting more
  - Revenue per tonne?
  - Efficiency in Collection?
  - Efficient Recovery?



Speakers

- What's new with the RSE Ontario Price Sheet
  - Neil Menezes, Reclay StewardEdge Inc.
- Monitoring Curbside Participation Rates with a GoPro Video Camera
  - Chris Fast, Dufferin County
- Diversion vs. Net Cost Analysis for Ontario BB System
  - Maria Kelleher, Kelleher Environmental

Reclay StewardEdge
Product Stewardship Solutions

What's New With the RSE Ontario Price Sheet CIF #868 & #869

Neil Menezes

Reclay StewardEdge Inc.

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Project Highlights

- Project goal:
  - Update Price Sheet to reflect current municipal needs & commodity markets
  - Provide additional resources for municipalities
- Anticipated Impacts:
  - Enable municipalities to obtain better commodity pricing
  - More information:
  - nmenezes@reclaystewardedge.ca
  - www.reclaystewardedge.com

RSE Ontario Price Sheet

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The Price Sheet

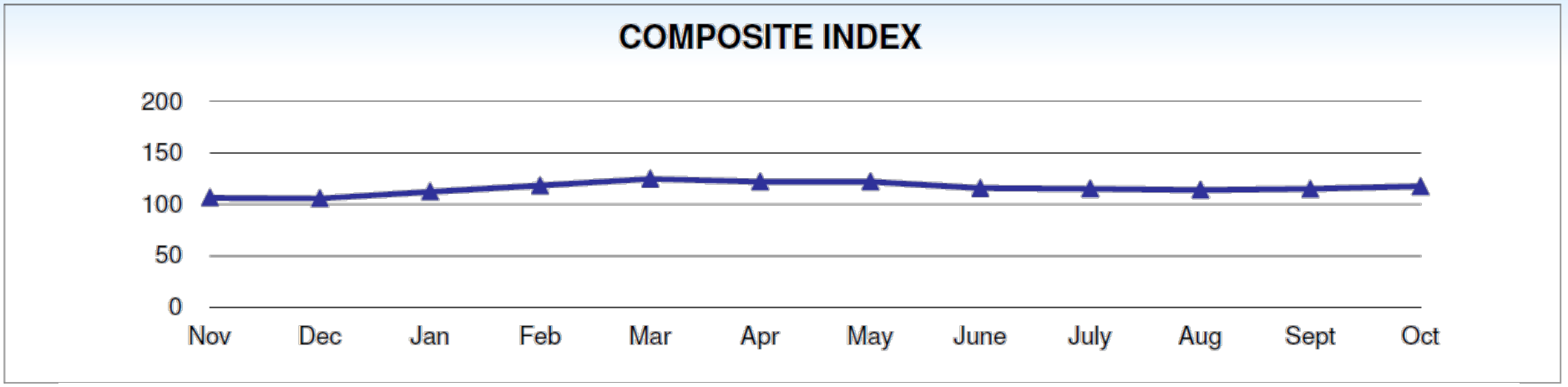
Ontario Market Price Trends for October 2014

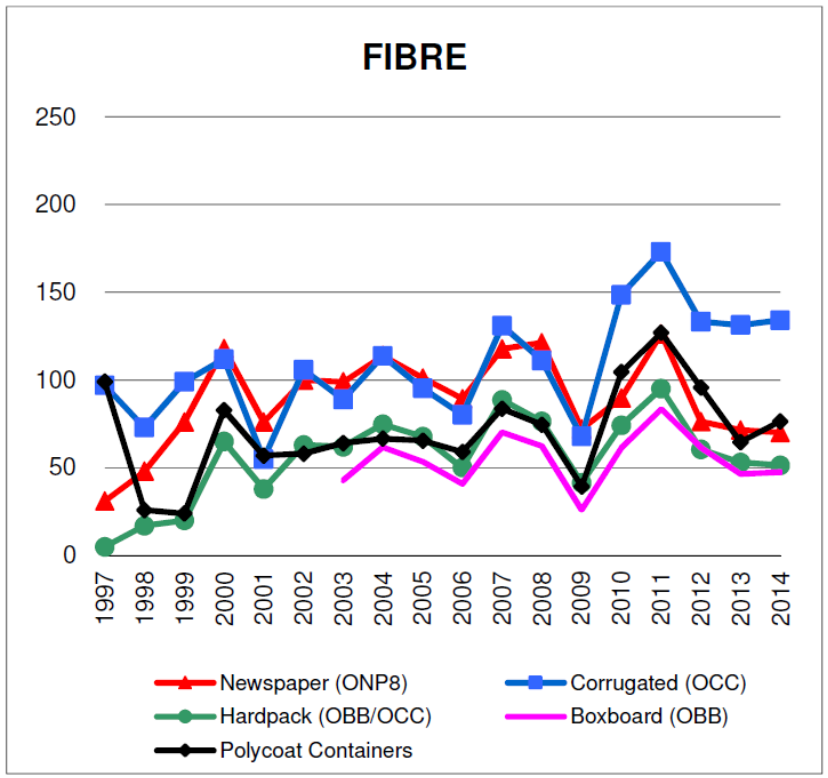
MONTHLY AVERAGES (CDN$/Metric Tonne)

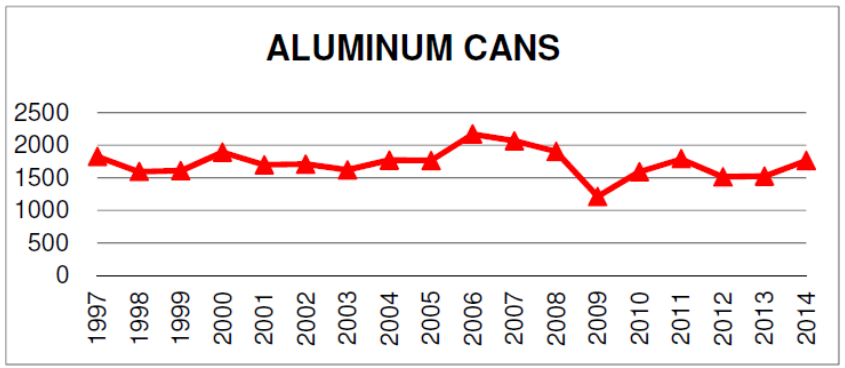
	May 2013	June 2013	July 2013	Aug 2013	Sept 2013	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	June 2014	July 2014	Aug 2014	Sept 2014	Oct 2014
Aluminum Cans	1583	1539	1470	1519	1481	1481	1487	1485	1556	1663	1747	1782	1794	1758	1813	1831	1840	1852
Steel Cans	232	230	250	242	242	247	275	301	324	302	294	305	313	305	310	310	311	296
Glass (clear)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Glass (mixed)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)	(22)
PET (mixed)	398	378	366	375	372	340	339	340	348	386	433	441	458	361	336	323	342	346
HDPE (mixed)	476	435	392	391	400	441	535	582	597	683	715	662	603	610	609	571	673	764
Plastic Tubs & Lids	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Mixed Plastics*	40	40	40	34	33	40	37	34	35	39	44	41	49	49	46	47	49	47
Film Plastic	15	15	15	10	8	6	7	15	12	12	12	21	28	32	30	30	30	50
Polystyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Newspaper (ONP #8)	74	72	71	64	65	67	68	67	69	71	72	71	71	69	69	69	68	70
Corrugated (OCC)	124	126	129	135	140	141	141	131	133	140	156	141	140	134	131	127	119	121
Hardpack (OBB/OCC)	54	54	55	46	53	51	52	48	49	53	60	53	53	51	50	51	46	48
Boxboard (OBB)	38	45	47	44	49	49	45	46	48	50	48	49	49	48	46	46	47	43
Polycoat Containers	65	65	65	65	67	67	61	59	61	64	72	78	79	77	76	84	85	88
Composite Index	**108**	**105**	**104**	**101**	**102**	**103**	**106**	**106**	**112**	**118**	**125**	**122**	**122**	**116**	**115**	**114**	**115**	**118**

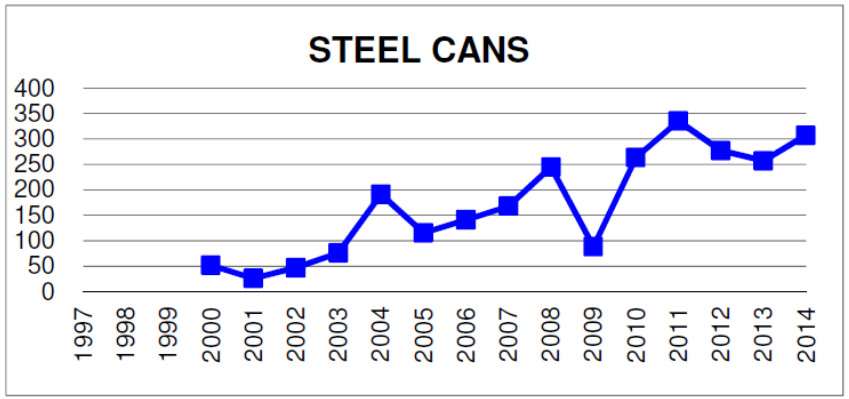
Reclay StewardEdge
Product Stewardship Solutions

RSE Price Sheet





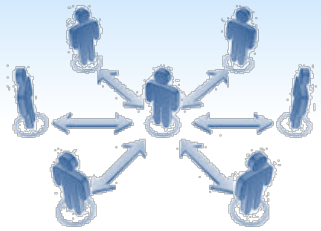




How We Create the Price Sheet

- Monthly reminders sent on 3rd Monday each month
- 17 municipal contacts + 5 other sources
  - brokers/end markets/news articles, etc.
- Data reported consistently as $/MT & as picked-up price
- Use trim mean
  - removes highest & lowest price
  - no weighting of the price
- Posted on RSE website & sent to ~200 email recipients

Who (Can) Benefit?



- Municipalities
  - Provides local data to municipalities that don't have the ability to market their own material
  - Enables municipalities to benchmark performance internally & anonymously against peers
  - Better pricing for municipalities means lower system costs
- Stewardship Ontario/Stewards
  - Municipalities that achieve higher price revenue over time help reduce system costs
- Markets/Brokers
  - Feedback service on what "market" is doing

Issues & Challenges

- Varying composition of commodities
- How to increase sample size?
- Adding other commodities/removing old commodities
- Weighting of average price
- Reflect current market conditions
- How to improve pricing?
- Consistent market terminology

Newspaper Commodities

- ONP#8
  - Sorted newspapers, not sunburned, & other acceptable papers. This grade is to be **relatively free from magazines** & contain not more than the normal percentage of rotogravure & colored sections.
  - Prohibitive Materials may not exceed 1%
  - Outthrows plus prohibitives may not exceed 2%
  - **Other acceptable papers may not exceed 10%**
- ONP#6
  - Sorted newspapers & other acceptable papers as typically generated by voluntary collection & curbside collection programs.
  - Prohibitive Materials may not exceed 2%
  - Outthrows plus prohibitives may not exceed 4%
  - **Other acceptable papers may not exceed 30%**

CIF Project #869: RSE Ontario Price Sheet Continuation (1)

- Project Objectives
  - Continuation of Price Sheet
  - Update the Price Sheet to reflect the needs of municipalities
  - Provide additional metrics (composite index for commingled fibres, composite index for commingled containers, etc.)

CIF Project #869: RSE Ontario Price Sheet Continuation (2)

- Project Status & Next Steps
  - CIF established a municipal steering committee including several municipal representatives & RSE
  - Proposing changes to current Price Sheet including:
    - Additional metrics
    - Updated list of commodities
  - Questionnaire to be released to all recipients of the Price Sheet to provide feedback
  - Goal to implement changes by **January 1, 2015**

CIF Project #868: Online Markets Directory

- Project Objectives
  - Online database of brokers & end markets
- Project Status & Next Steps
  - CIF looking to establish a similar steering committee
  - Need to determine if municipalities see a need for a database
    - RSE to contact municipalities for suggestions/feedback
    - RSE to contact brokers & end markets to gauge interest
  - A recommendation will be made to the CIF whether or not to develop the database

What we Need?

- Increase municipal participation for Price Sheet
- We are looking for feedback & suggestions from all stakeholders
- What do you want to see?

RSE Contact:
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416-644-8349
nmenezes@reclaystewardedge.ca

CIF Contact:
Alec Scott
705-722-0225
archenv@sympatico.ca

DUFFERIN COUNTY

Monitoring Curbside Participation Rates with a GoPro Video Camera CIF #809.5

Chris Fast

Dufferin County

CIF CONTINUOUS IMPROVEMENT FUND

Project Highlights

- Goals
  - Evaluate bag limits & program participation rates
  - Evaluate **GoPro video camera** as a monitoring tool

  Impacts
  - Assisted Council in bag limit review
  - Bag limits streamlined
- More information:
  - cfast@dufferincounty.ca
  - http://www.dufferincounty.ca/waste

New Curbside Program

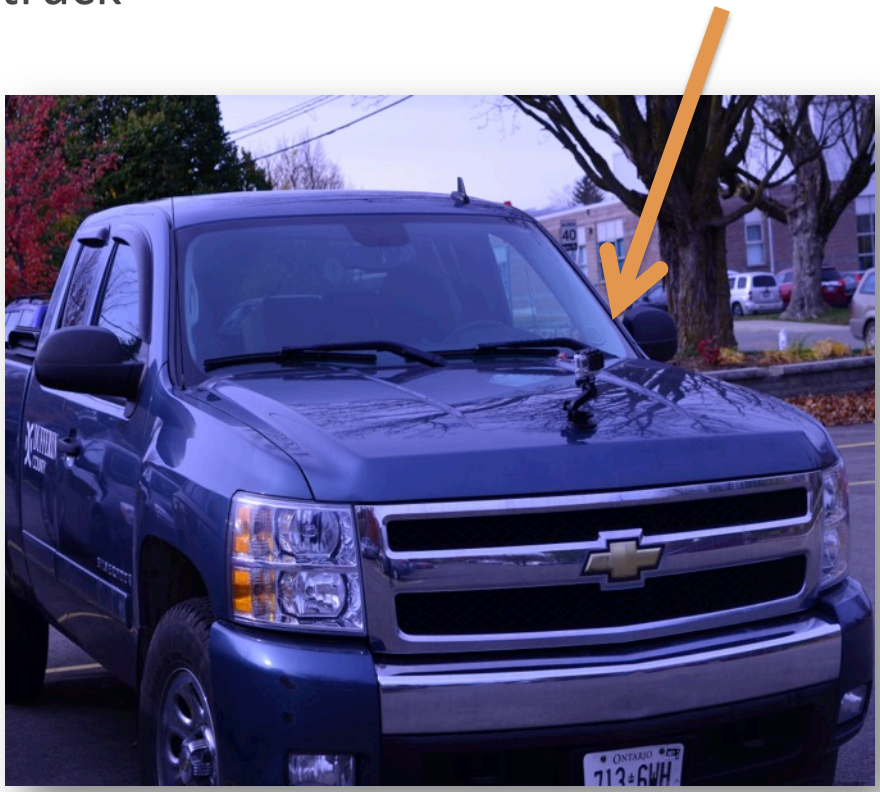
- New program 2013 – County-wide
  - New bylaw – clear bags – different bag limits
  - County provided new BB (CIF #809.5)
- How can we *easily* measure:
  - Set out rates/ participation
  - Bag limits
  - Compliance

Options for Assessing Set-out & Participation Rates

Options	Pros	Cons
GPS/RFID	Automated software collects/consolidates data	High cost upfront for capital
Contractor	Collection staff already on road, knowledge of routes	Lower data quality, potential bias, disruption in service
Ride Along	Low bias & capital costs	High staffing costs, errors in data recording
GoPro	Low cost, less staff resources, video storage capability	Unused previously

Participation/Set-out Study Details (1)

- Pilot & camera troubleshooting
  - Positioned on front – center of truck
  - Easy installations/adjustments
- Paralleled previous ride along routes – comparison
  - Urban vs. rural
  - High vs. low density
- Parameters
  - 1,542 homes
  - 12 collection routes
  - Video transfer & storage



Participation/Set-out Study Details (2)

Address	# Garbage Bins	# Garbage Bags	# Recycling Bins	# Recycling Bags	# Green Bins	Yard Waste (Y/N)	Garbage Box (Y/N)
232135	1	0	1	0	1	N	N
232167	1	0	2	0	0	Y	N
232227	0	1	1	1	1	N	N
232250	0	0	0	0	0	N	N
232135	0	0	1	0	0	Y	N

GoPro Evaluation

Metric	Ride Along	GoPro
# Homes	1,356	1,356
# Staff	2	1
Staff – hourly wage	$25	$25
Hours of staff time	65	35
Total Cost	**$1,625**	**$875**

- Advantages
  - Driving speed limit while capturing data
  - Storage of video for later review
  - Cost-savings versus previous method

GoPro Capital Cost
$550/unit

Participation/Set Out Study Results (1)

Metric	Set Out / Week	Participation Rate
Garbage (Overall)	0.968 bags/containers	N/A
Garbage (Rural Areas)	0.678 bags/containers	N/A
Garbage (Urban Areas)	1.01 bags/containers	N/A
Blue Box	1.344 blue boxes	94.80%
Green Bin	N/A	79.27%

- Challenges
  - Parked cars → use audio component to describe
  - Multiple setouts at one location

Participation/Set Out Study Results (2)

Garbage Weekly limit	Municipalities	Avg set out / hh
One	Mulmur, Orangeville	0.830
Two	Amaranth, Grand Valley, Melancthon, Mono, Shelburne	1.036
Three	East Garafraxa	1.091

- Council approved single bag limit – June 1, 2014
- GoPro is now a current monitoring tool
  - Expand data collection for P&E, other Public Works' functions

Key Takeaways

- GoPro: an effective & multi-purpose tool
  - Easy installation & adjustments
  - Minimal logistics management
  - Video storage for later review is great
  - Demonstrated cost/time – savings
    - Will cost $500 upfront – payback in one study
  - You can go back & add parameters to your study

Diversion vs. Net Cost Analysis for Ontario Blue Box System

CIF Project #722

Maria Kelleher

Kelleher Environmental

Project Highlights

- Project goal: Carry out high level analysis of most cost efficient way to add materials & increase BB system diversion performance
- Impacts:
  - Estimated impacts of adding or removing materials from Provincial BB system
  - Assessed impacts of changing BB material composition on costs & diversion levels in future
- More information:
  - maria@kellenv.com
  - www.kelleherenvironmental.com

Blue Box System Diversion & Cost Statistics (2012)

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2012 Ontario BB System Performance & Net Cost

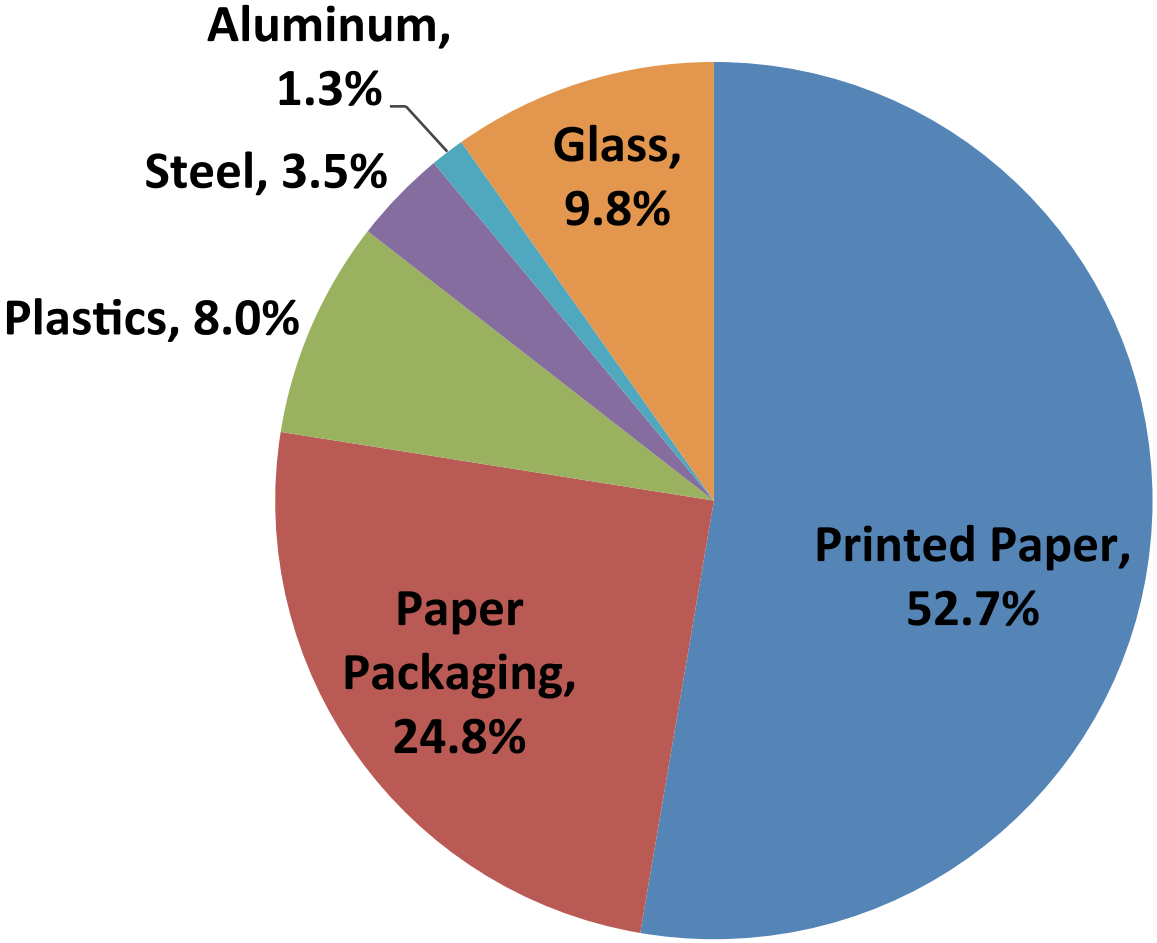
- BB diverted almost 893,000 tonnes of residential printed paper & packaging in 2012
  - 62.8% diversion rate
- Net system cost $198M
  - Gross cost $313M
  - Revenues $115M

Most of BB Diversion is Paper Based Material

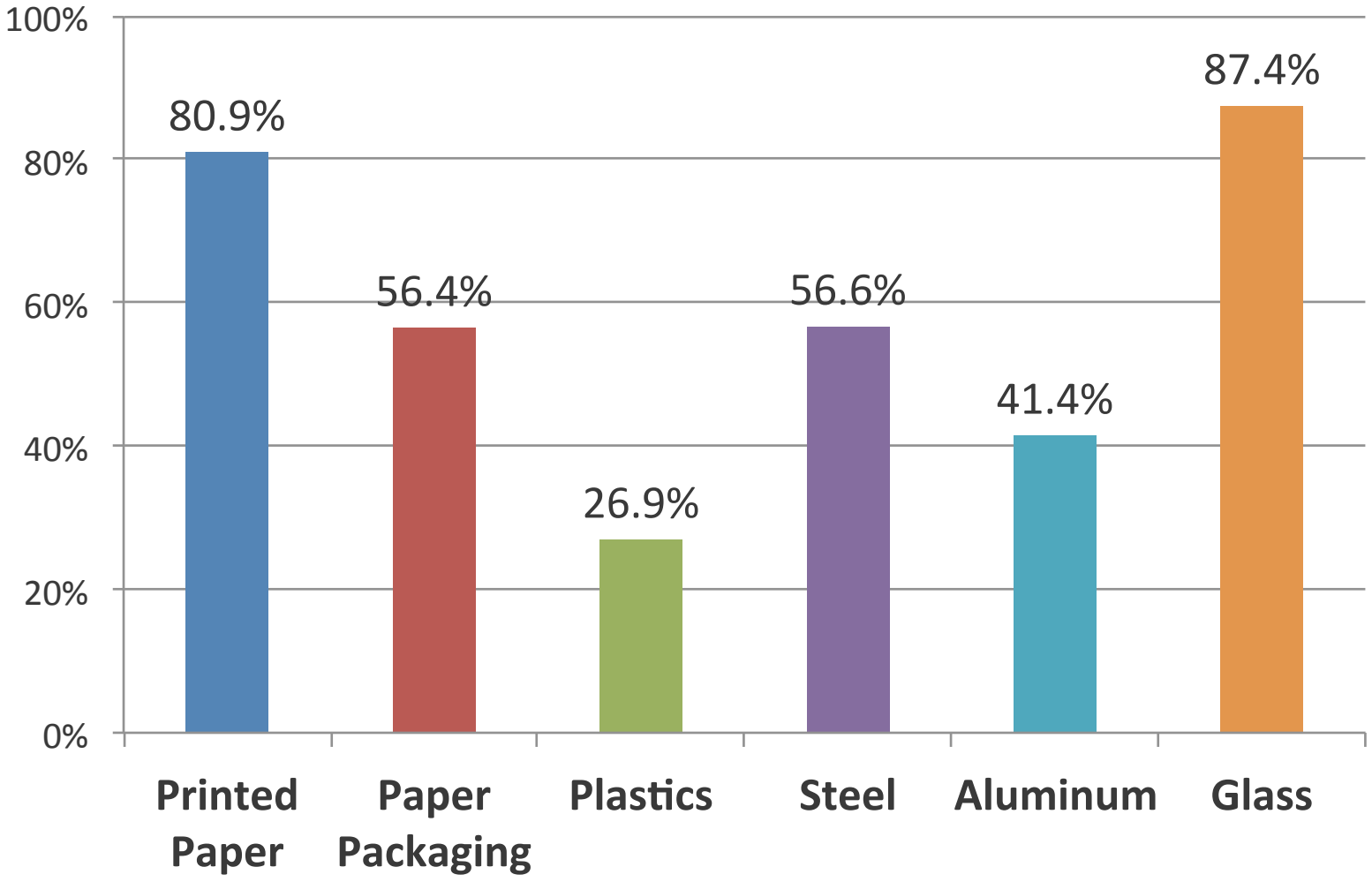
Of the 893,000 tonnes diverted:

- 77.5% is paper based materials
  - 52.7% was printed paper (newspapers, magazines, catalogues, flyers, junk mail, etc.)
  - 24.8% was paper packaging (OCC, boxboard, etc.)
- 9.8% was glass packaging
- 8.0% was plastic packaging
- 4.8% was metal packaging (steel & aluminum cans, pie plates, etc.)

Contribution of Different Materials To BB Diversion (% in 2012)



Recycling Rate By Material (2012)



Cost vs. Diversion Analysis Approach & Key Assumptions

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Approach To Developing Cost vs. Diversion Analysis

- Start from today's (2012) BB mix & cost/tonne by material (from 2014 PIM*)
- Each 1% increase/decrease in diversion – add/ subtract 14,000 tonnes to BB
- Remove most expensive materials first to reach lower diversion
- Add least expensive materials first to increase diversion
- Each material had an upper limit recycling rate

**Pay In Model available at www.stewardshipontario.ca/stewards-bluebox/fees-and-payments/fee-setting-flow-chart/the-pay-in-model/*

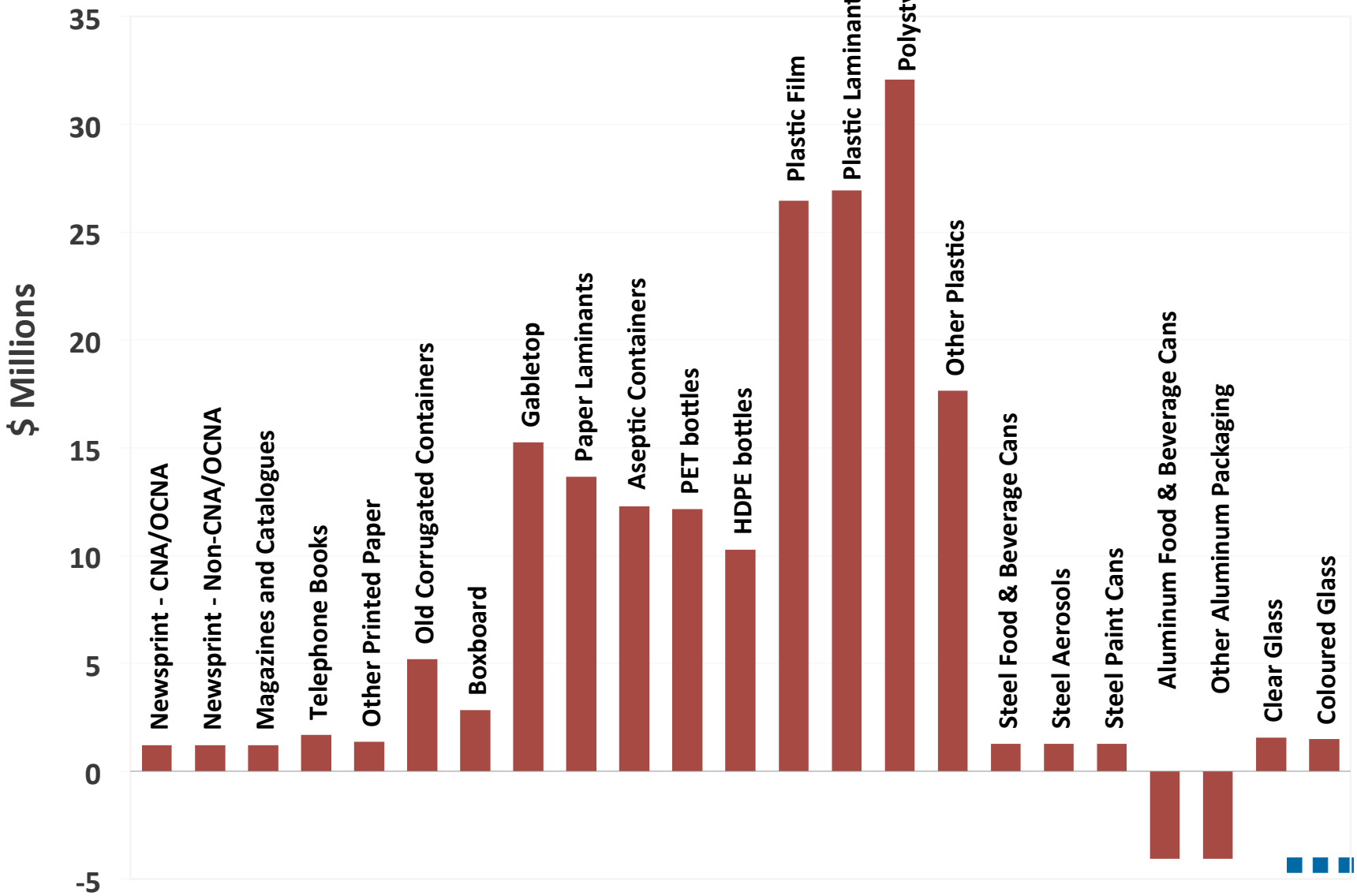
2012 BB – Net Costs By Material – Printed Paper & Paper Packaging

BB Material	Gross Cost ($/tonne)	Revenue ($/tonne)	Net Cost ($/tonne)
Newspapers, magazines, catalogues	$173	$88	$85
Other printed paper	$185	$89	$96
Telephone books	$211	$92	$119
Boxboard	$288	$89	$199
Old corrugated containers (OCC)	$483	$118	$365
Aseptic containers	$960	$96	$865
Paper laminates	$960	-	$960
Gabletop	$1,171	$98	$1,073

2012 BB - Net Costs By Material - Packaging

BB Material	Gross Cost ($/tonne)	Revenue ($/tonne)	Net Cost ($/tonne)
Aluminum	$1,114	$1,400	-$286
Steel cans	$352	$263	$89
Coloured glass	$125	$21	$105
Clear glass	$136	$26	$110
HDPE	$1,196	$474	$723
PET	$1,281	$425	$855
Other plastics	$1,388	$146	$1,242
Plastic film	$1,895	$33	$1,862
Plastic laminates	$1,895	-	$1,895
Polystyrene (PS)	$2,292	$37	$2,255

Cost To Recycle 14,000 Tonnes (1% Additional Diversion) By Material



Current Recycling Rate & Max Potential Recycling Rate – Printed Paper & Paper Packaging

BB Material	Current Recycling Rate (%)	Max Recycling Rate (%)
Newspapers, magazines, catalogues	93.7%	95%
Other printed paper	45.2%	75%
Telephone books	95.7%	No increase
Boxboard	41.5%	85%
Old corrugated containers (OCC)	85.3%	90%
Aseptic containers	16.4%	85%
Paper laminates	3.2%	25%
Gabletop	48%	85%

Current Recycling Rate & Max Potential Recycling Rate – Packaging

BB Material	Current Recycling Rate (%)	Max Recycling Rate (%)
Aluminum	48.2% f&b* 7.7% other	80% f&b 60% other
Steel cans	64.5% f&b 23.1% aerosols	85%
Coloured glass	68.1%	80%
Clear glass	94%	94%
HDPE	59.5%	85%
PET	57.5%	90%
Other plastics	22.8%	75%
Plastic film	9.1%	60%
Plastic laminates	0%	25%
Polystyrene (PS)	6.8%	25%

** Food & Beverage*

Cost vs. Diversion Analysis Results

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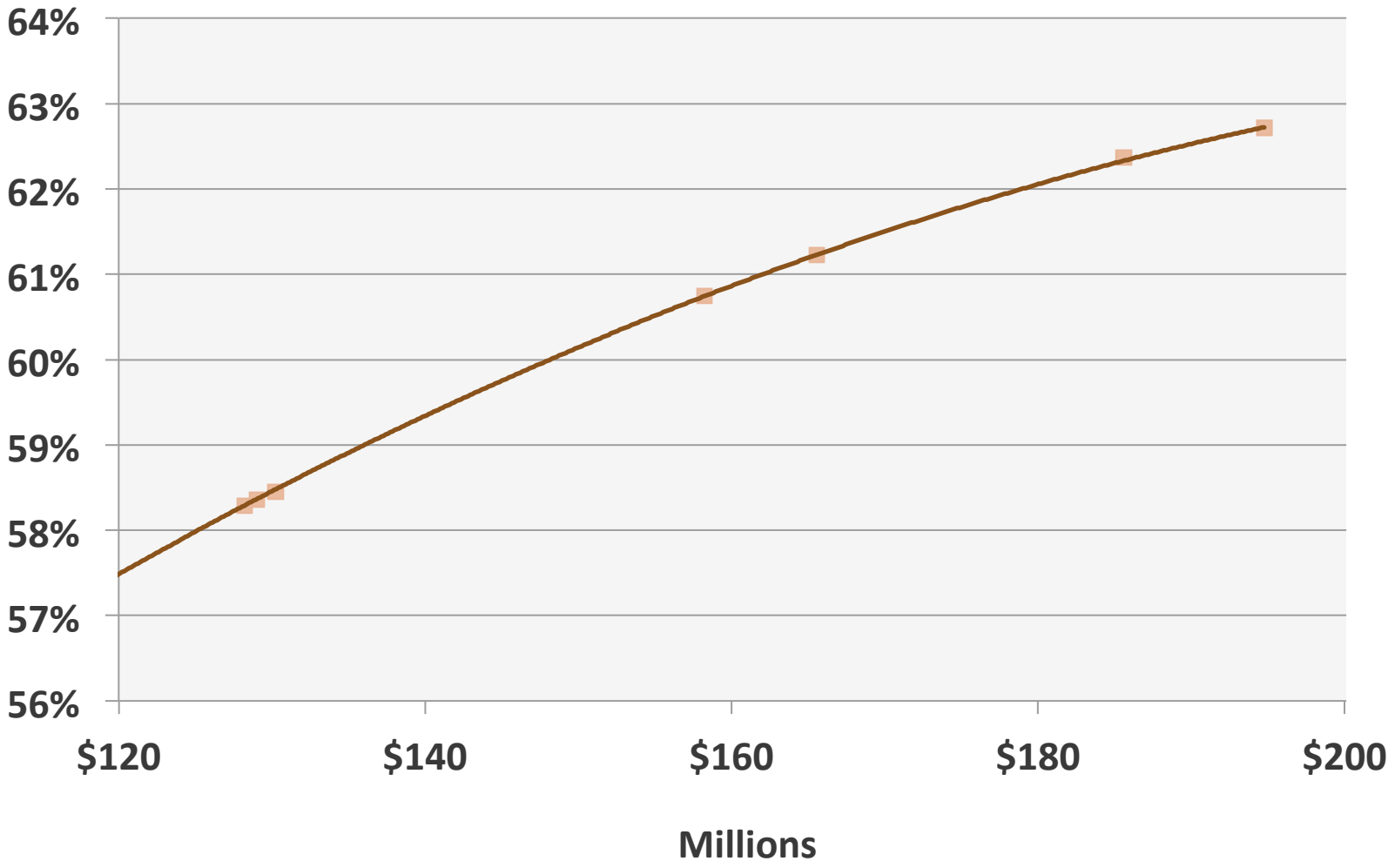
Scenario 1: Starting From Today – 62.8% Diversion & $198 M/Year… Remove Most Expensive Materials

BB Material No Longer Collected in BB System	Net Cost Reduction ($M/year)	Reduction in Diversion (%)	Theoretical BB Annual System Net Cost ($M/year)	Tonnes (tonnes)	BB Diversion Rate (%)
Polystyrene	$2.24	1.51%	$194.76	1,018	62.7%
Plastic Laminates	$0.01	0.00%	$194.75	7	62.7%
Plastic Film	$9.16	0.35%	$185.59	4,923	62.4%
Other Plastic	$20.05	1.14%	$165.54	16,146	61.2%
Gabletop	$5.77	0.74%	$159.77	6,833	60.4%
Paper Laminates	$1.21	0.09%	$158.56	1,264	60.4%
Aseptics	$0.83	0.07%	$157.73	955	60.3%
PET	$29.53	3.52%	$128.20	32,701	56.8%

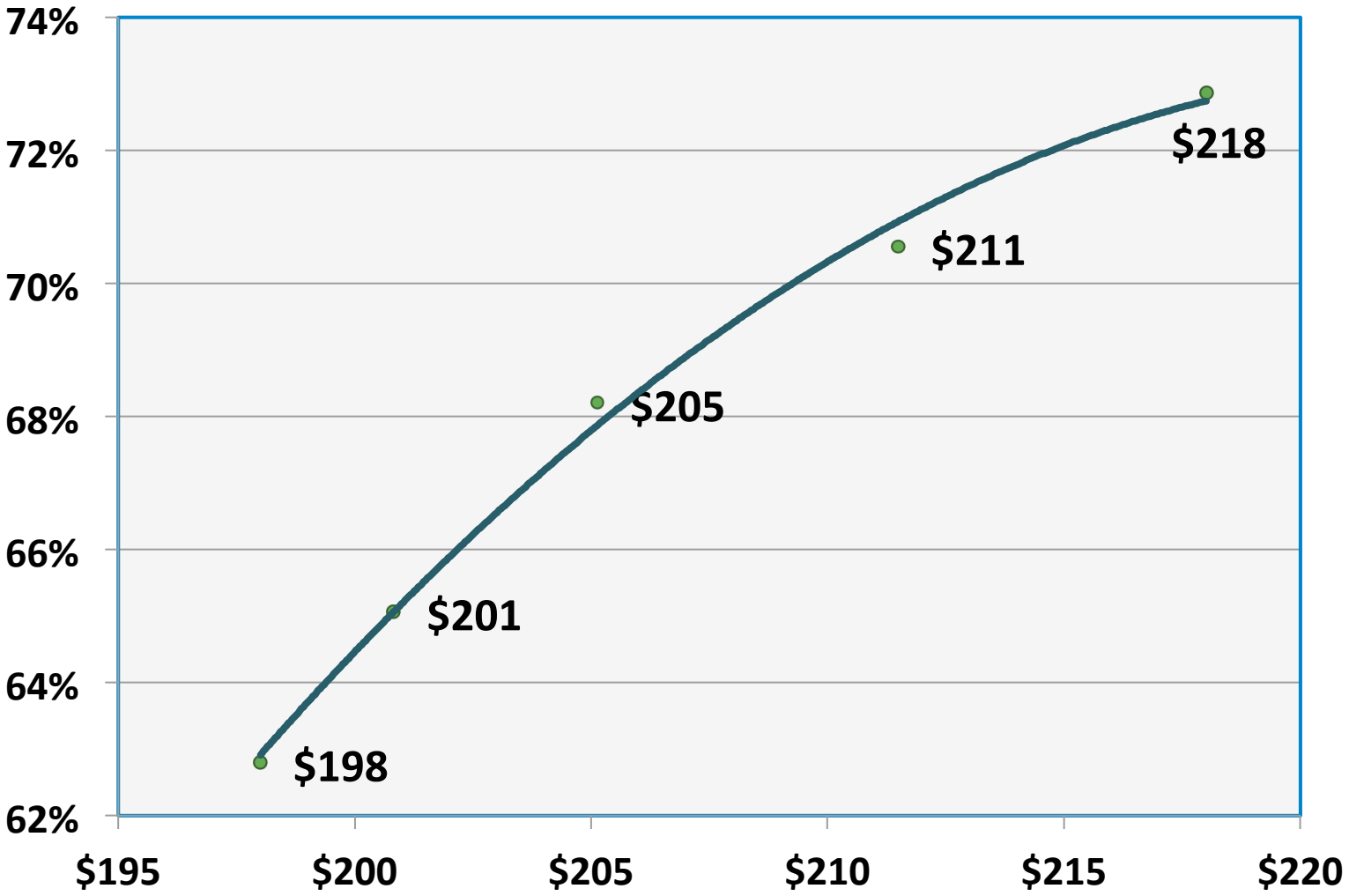
Scenario 1: Starting From Today – 62.8% Diversion & $198 M/Year… 60.3% Diversion Costs $158 M/Year



Scenario 2: Increase Recovery of Existing BB Materials To Increase Diversion

Strategy	Additional Tonnes Recycled	Additional $ to 2012 BB System Cost ($/y)	Additional Diversion (%)	BB System Cost ($)	Total BB Diversion (%)
2012 – Base Case				$ 198	62.8%
A – Increase recovery of Printed Paper to 95% & Steel Food & Beverage Cans & Steel Aerosols to 85%, & Steel Paint Cans to 60%	32,100	$ 2.8	2.3%	$ 201	65.1%
B – increase Recovery of Other Printed Paper & Coloured Glass to 80%	44,650	$ 4	3.1%	$ 205	68.2%
C – Increase Boxboard recovery to 60%	33,400	$ 6	2.4%	$ 211	70.6%
D – Increase Boxboard recovery to 80%	32,800	$ 7	2.3%	$ 218	72.9%

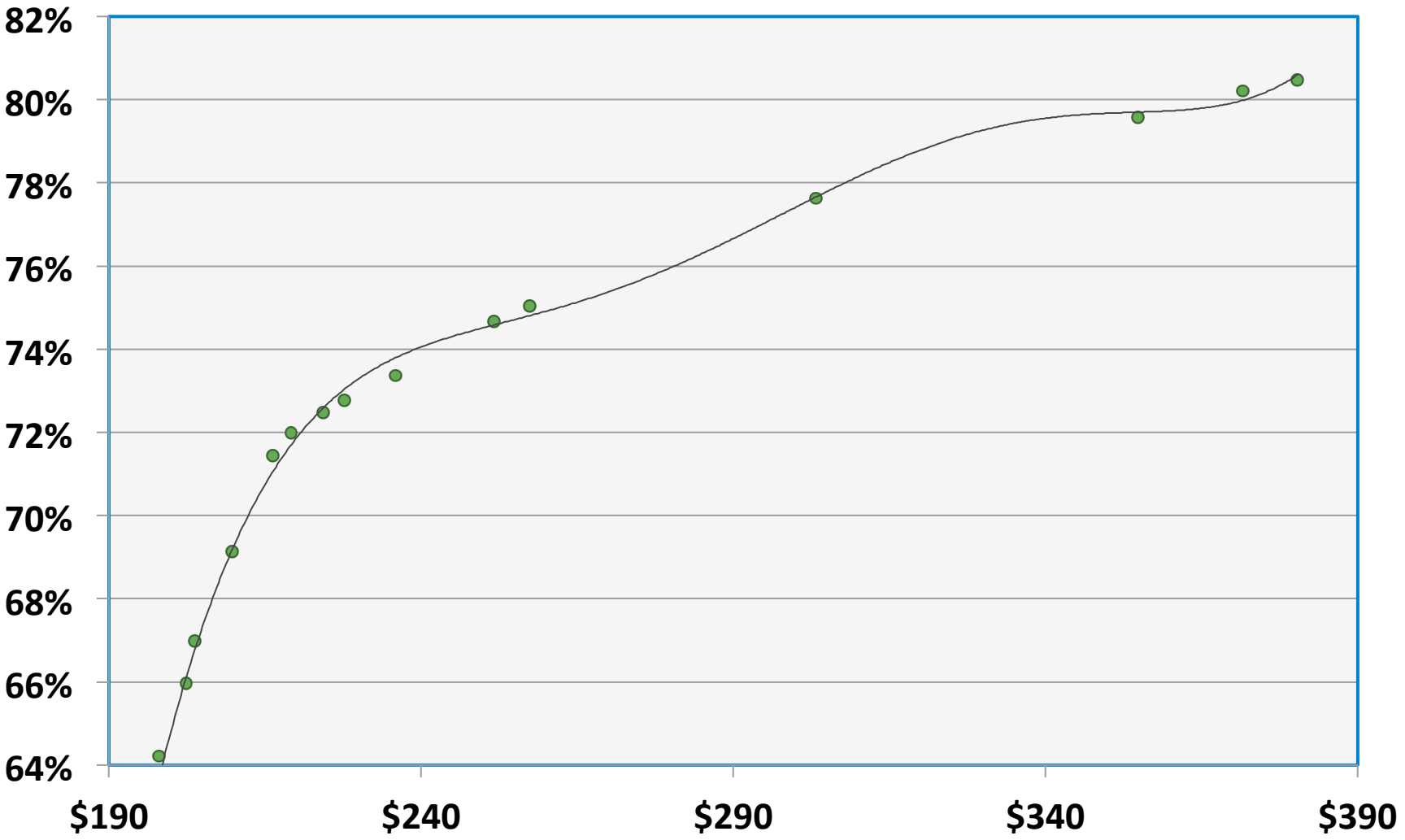
Scenario 2: Increase Recovery of Least Cost Materials – 73% Diversion Would Cost $218 M/Year



Scenario 3: Maximum Potential Diversion Through Existing BB System

- Increase recovery of existing materials to maximum potential
- 82% Diversion
- BB System Cost $382 M
  - $198 M for 62.8% Diversion (2012)
- “Break Point:” at about 72% diversion
  - each additional 1% costs a lot

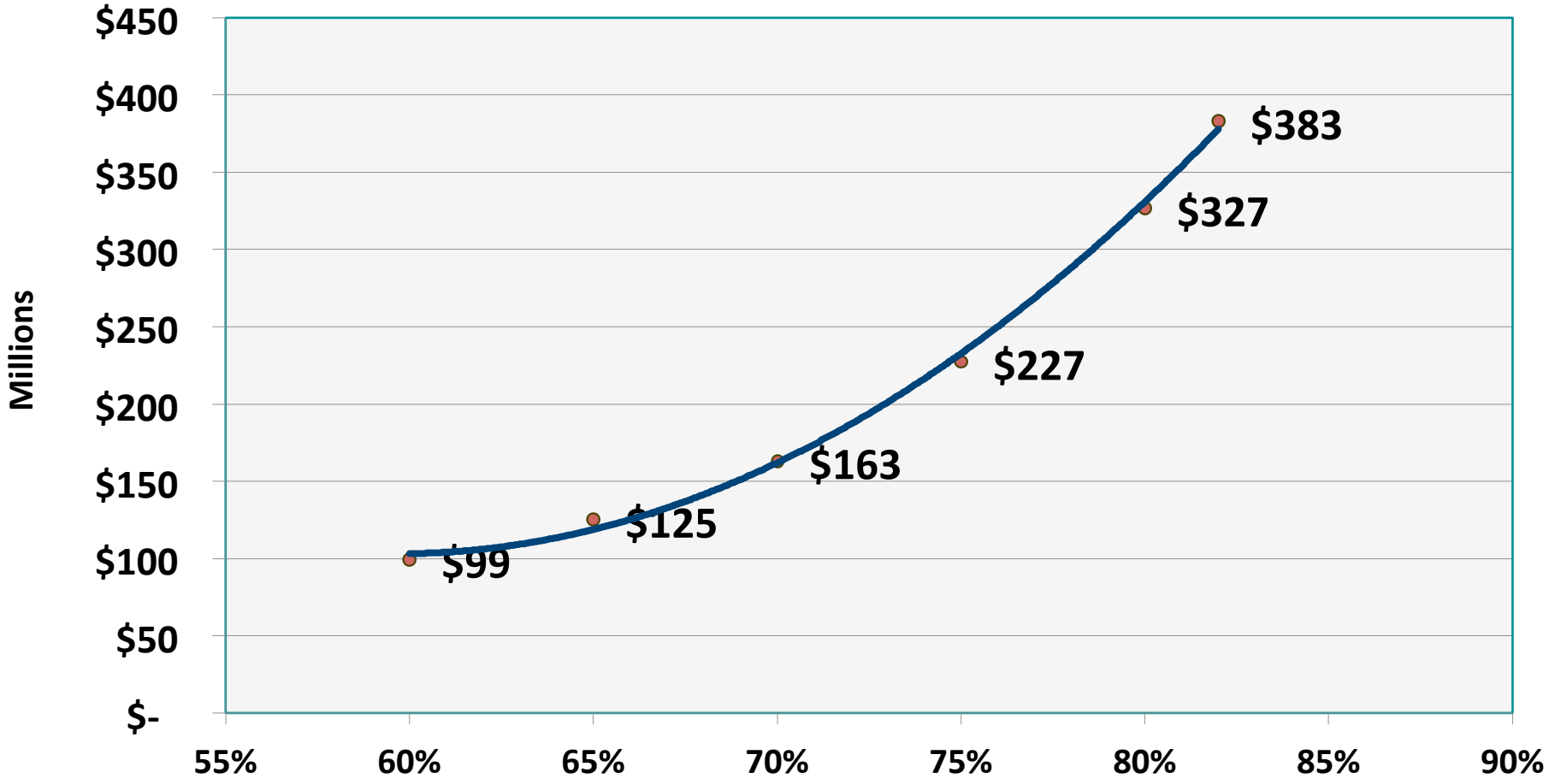
Scenario 3: Maximum Possible Diversion – 83% at $430 M/Year



Scenario 4: Blank Slate … If We Were Starting From Scratch Today … & Wanted to Reach 60% ...

- BB could achieve 60% diversion for $99 M/year (2012 costs & composition)
  - Half the current cost
- Materials in BB:
  - Newsprint, magazines & catalogues, printed paper, telephone books
  - Steel cans, aluminum
  - Clear & coloured glass
  - Boxboard & OCC
- No PET or HDPE
  - Ontario Reg 101/94 mandates collection of PET

Scenario 4: Blank Slate – If We Were Starting Today ... 60% Could Cost $99 M/Year

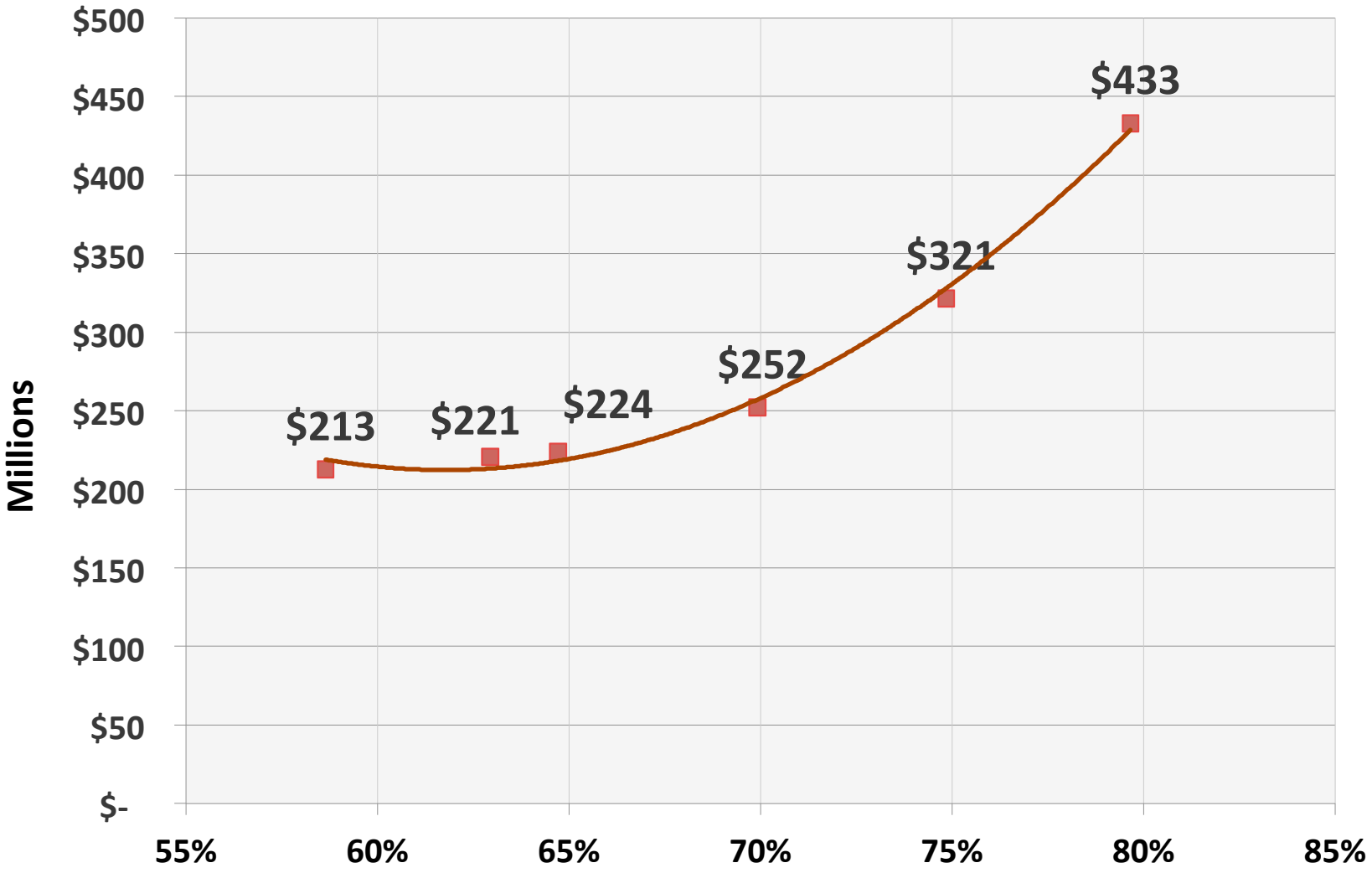


Scenario 5: Implications of Future BB Composition – The "Evolving Tonne"

- BB composition is changing with less newsprint & printed paper & more lightweight materials (plastics)
- Costs will increase as density of BB material mix decreases

BB System Diversion	Estimated BB System Costs Based on 2012 Cost Data ($M/year)	Estimated BB System Costs With Future Composition ($M/year)
60%	$158	$218
65%	$201	$224
70%	$211	$252
75%	$242	$321
80%	$325	$433

Scenario 5: Impacts of Future BB Composition on System Costs



Conclusions (1)

- Adding new materials is not cheapest way to increase diversion
- Increasing recovery of existing low cost materials is best way to get higher diversion
- Maximizing “other printed paper” recovery (currently 45.2%) to 80% is the most cost efficient way to increase diversion

Conclusions (2)

- No new materials should be added to a BB program until cost & diversion implications are fully understood
- Practicality of collecting materials with a net cost of >$1,000/tonne by a comprehensive depot system in Ontario rather than curbside should be explored
- Future BB composition (more plastics, less paper) will increase system costs