

PRODUCT CARE ASSOCIATION BC COLLECTION SITE COSTING

OCTOBER 22, 2019





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October 22, 2019

Dear Stakeholders,

BDO has been engaged to aid Product Care Association of Canada ("Product Care") in their efforts to develop a BC Collection Site Compensation Methodology Model and we have provided our observations and recommendations in the Report attached. This Report is for discussion purposes as part of the Stakeholder Consultation Process.

We would like to take the opportunity to thank the efforts and commitment that the team at Product Care as well as the participation from the selected Recycling Collection sites have given us to enable us in completing our engagement.

If in reviewing this report it is determined that any collection site's costs differ materially than those noted within our cost model, we invite you to contact Ashley Whitworth at (250) 744-8243.

Sincerely,

BDO Canada LLP Chartered Professional Accountants

EXECUTIVE SUMMARY

BACKGROUND

Product Care Association of Canada (Product Care) engaged BDO Canada LLP ("BDO") to develop a Collection Site Compensation Model, which would identify the various cost inputs for the collection, packaging, and shipping of products by collection sites for Product Care's BC programs. This model was developed to determine if the compensation paid to the collection sites by Product Care adequately supports the costs of collecting and handling of the end of life products.

SCOPE & APPROACH

This report focuses on an assessment of the costs incurred by BC collection sites to collect and handle end of life products in the Paint and Household Hazardous Waste, Lighting products, and Smoke/CO Alarms programs.

While BDO aimed to incorporate information related to direct costs as well as relevant portions of overhead, there were several scope restrictions throughout the engagement, including the following:

- Participation
 - There were limited respondents from the Product Care contracted collection sites across BC that were willing and able to participate in the in-depth analysis dimension of the engagement and provide the relevant information required to extrapolate data.
- Comparison of subjective data
 - Information collected and provided by participants from the various collection sites may not always result in comparable and accurate data (for example, much of the activitybased costing factors were undocumented estimates provided verbally by employees at the collection site given they have not undertaken such analysis themselves).

The primary objectives of the engagement were to conduct market research and identify the various costs to run collection sites for the applicable programs, in order to determine if the compensation to the collection sites adequately covers their costs of collecting and handling end of life products as specified in section 5 (1) of the BC Recycling Regulation with respect to program plan approval:

5. (1) [...] the director may approve the plan if the director is satisfied that

[...]

(c) the plan adequately provides for

(i) the producer collecting and paying the costs of collecting and managing products within the product category covered by the plan, whether the products are currently or previously used in a commercial enterprise, sold, offered for sale or distributed in British Columbia,

[...]

We note that in reference to the selected collection sites referenced below, the intent was to select collection sites that were most likely to obtain a productive and representative response. Due to the scope restrictions noted above, Product Care assisted in the process of identifying participating collection sites, similarly to work performed for other organizations.

To perform the assessment and meet the objectives listed above, BDO applied the following approach:

- Conduct preliminary meetings with Product Care project team to gain a more detailed understanding of the programs in scope and any relevant data collected by Product Care to date;
- Conduct on-site visits with BC collection sites to visualize operations, and space dedicated to each of the Product Care programs noted within the scope;

- Conduct telephone interviews with a selection of five BC collection sites to gain a detailed understanding of the operations relating to the end of life products and the associated direct and overhead costs;
- Obtain and review existing documentation, including available and relevant time-motion studies and financial information;
- Evaluate current compensation against identified costs;
- Develop a collection site costing model, with description of methodologies and assumptions based on the data collection and research conducted;
- Run scenario analyses on the collection site compensation model to determine margin results at collection sites given varying cost information and assumptions; and
- Validate observed findings and potential recommendations with Product Care management.

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BACKGROUND

Product Care Association of Canada ("Product Care" or "PCA") manages regulated paint (paint), household hazardous waste (HHW), lighting products (lighting), and smoke/CO alarms (alarms) recycling programs, referred to as Extended Producer Responsibility ("EPR") programs, across Canada. EPR-based collection programs are government regulated, and serve the purpose of holding industry accountable for managing the end of life of their products, including the recycling of products that are supplied within the jurisdiction. Through these programs, Product Care has made strides in greatly reducing the amount of waste that end up in Canada's landfills each year.

Provinces have developed their own regulations, guidelines and policies for EPR, making each area unique. In B.C., EPR programs must describe their proposed operations and targets within a Program Plan, referred to as an "EPR Plan", which the BC Ministry of Environment and Climate Change Strategy ("MoE") approves. On occasion, the MoE may request further commitments and undertakings for EPR plans.

The MoE recently requested that Product Care B.C. undertake a review of the compensation methodology for collection sites as a program plan approval requirement with reference to the provision of s. 5(1)(c)(i) of the Recycling Regulation that an EPR plan adequately provides for the producer collecting and paying the costs of collecting and managing products within the product category. The MoE has issued a guidance document entitled "Producers Paying the Cost of Managing Obligated Materials and Dispute Resolution 2018", in which the MoE has provided producers and agencies with direction on the expectations that the Ministry has in this regard with respect to the EPR plans.

Product Care B.C. engaged BDO Canada LLP ("BDO") to assist in the development and application of a cost model for collection sites, to identify the various costs being incurred to run collection sites in order to determine if the compensation paid to the collection site adequately covers the costs of collecting and handling the applicable end of life products.

SCOPE

This report focuses on an assessment of the costs incurred by BC collection sites to collect and handle end of life paint, household hazardous waste, lighting products, and smoke/CO alarms (collectively, "the products"). While BDO aimed to incorporate information related to direct costs as well as relevant portions of overhead, there were several scope restrictions throughout the engagement including the following:

- Participation
 - There were limited respondents from the Collection sites that were willing and able to participate in the in-depth analysis dimension of the engagement and provide the relevant information required to extrapolate data.
- Comparison of subjective data
 - Information collected and provided by participants from the various collection sites may not always result in comparable and accurate data (for example, much of the activitybased costing is an estimate provided by collection sites, given they have not undertaken such analysis themselves).

APPROACH

The primary objectives of the engagement were to conduct market research, including information from representative collection sites, identify the various costs to run collection sites for the related programs, and determine if the compensation paid to the collection sites adequately covers their costs of collecting and handling end of life products. It should be noted that in reference to the representative collection sites below, the intent was to select recycling collection sites that were both representative and likely to provide the required information. Product Care assisted in the process of identifying the participating collection sites that would likely participate. Furthermore, BDO leveraged applicable information (primarily space cost/rent for different locations) collected during a separate engagement with another BC EPR program.

To perform the assessment and meet the objectives listed above, BDO applied the following approach:

- Conduct preliminary meetings with Product Care project team to gain a more detailed understanding of the programs in scope and any relevant data collected by Product Care to date;
- Conduct on-site visits with BC collection sites to visualize operations, and space dedicated to each of the Product Care programs noted within the scope;
- Conduct telephone interviews with a stratified sample of five BC collection sites to gain a
 detailed understanding of the operations relating to the end of life products and the associated
 direct and overhead costs;
- Obtain and review existing documentation, including available and relevant time-motion studies and financial information;
- Evaluate current compensation against identified costs;
- Develop a Collection Site Costing Model, with description of methodologies and assumptions based on the data collection and research conducted;
- Run scenario analyses on the collection site compensation model to determine margin results at collection sites given varying cost information and assumptions; and
- Validate observed findings and potential recommendations with Product Care management.

Our approach assessed:

- > Direct costs incurred to run the Product Care programs at a sample of BC collection sites;
- > Differences and gaps in compensation compared to identified costs; and
- The adequacy of compensation provided to collection sites for collecting and handling end of life products.

PRODUCTS REVIEWED

For reference, the full list of all materials in scope for each program, in British Columbia is located on the <u>Product Care</u> website.

Paint		Hazardous household Waste ("HHW")		Lighting Products		Fire	Alarms
Household Paint	Interior and Exterior	Pesticides "Domestic"	Liquid Solid Aerosol	Light Bulbs	Compact Fluorescent	Alarms	Smoke Alarms Carbon
Paint Aerosol	Automotive Craft Industrial	Flammable Liquids	Such as: Gasoline Acetone Methanol Methyl Paint Thinners		Tubes UV bulbs LEDs HIDs UHP Etc.		Monoxide Alarms Combination Smoke and CO Alarms

OVERVIEW OF PRODUCT CARE COLLECTION SYSTEM

The Product Care BC collection site system consists of a total of 533 collection sites of which 284 are paid for the collection function and 249 provide the service on an unpaid basis:

284

249

533

TOTAL paid collection sites * (one or more programs)
TOTAL unpaid collection sites ** (one or more programs)
TOTAL collection sites

Note:

*Paid collection sites here are defined as any site that generates *non-zero* net revenues, considering the impact of paint&HHW penalties. This includes 37 collection sites with negative revenues due to penalties not fully offset by positive revenues.

**Unpaid collection sites are defined as any site that generates zero net revenues.

The following shows the number of collection sites by program (note that many collection sites collect products for more than one program and therefore are counted for each program).

Product	Paid	Unpaid	TOTAL
Paint	173	49	222
HHW ¹	103	6	109
Lighting	196	246	442
Alarms	105	97	202

The types of <u>paid</u> collection sites include:

- Beverage container collection sites (primary business is collecting beverage containers from consumers and refunding the deposit). Bottle collection sites may or may not be licensed by one or more of the provincial beverage container EPR programs.
- Local government transfer stations that may or may not be located at a landfill and usually accept a variety of waste and recyclables.
- Not-for-profit recycling centres, which are often operated under the approval/contract with a local government
- Others including distributors of products such as lighting.

The types of <u>unpaid</u> collection sites are mainly retailers who sell the new products and want to provide convenience to existing customers and to attract new customers. Other non-paid collection sites include local government sites, scrap metal yards (for lighting fixtures), and second-hand stores.

¹ *Note that all sites that collect HHW also collect paint; however, some sites collect paint but not HHW. There are no sites that collect HHW but not paint. Paint and HHW are linked from a product user point of view as some of the flammable liquids included in HHW, such as paint thinner, are the products used in connection with painting.

Accordingly, the Product Care collection system includes a variety of types of collection sites, the majority of which do not require payment as they derive benefit from participating as a collection site in other ways. This report is limited to paid collection sites.

With regard to the paid collection sites, essentially, all were already operating for the purpose of providing recycling or waste management services to consumers/residents at the time of entering into a contract with Product Care. For sites, the addition of the Product Care products, as well as other EPR programs, generally results in operational synergies by leveraging existing operational structures, facilities, equipment, and staffing.

All paid collection sites operate under a contract with Product Care, which includes the following provisions:

- Rates of payment for services, usually based on quantity collected. It is noted that quantity collected in Product Care's programs is generally increasing. On average, the quantity collected in Product Care programs has increased by the following:
 - Paint/HHW 6.8% since 2003
 - Lighting Programs 21% since 2013
 - Smoke/CO Alarms 28% since 2013
- Environmental insurance coverage provided in relation to the Product Care program/products.
- Automatic renewal with ability to terminate on notice.
- Other commercial legal provisions.

RESEARCH & DATA COLLECTION

ON-SITE VISITS

BDO conducted on-site visits to various collection sites to observe the handling process. In addition, Product Care performed five on-site visits and shared photographic and video evidence from the various locations. The collection sites visited included not-for-profit and for-profit collection sites within urban and sub-urban areas of varying sizes.

During the on-site visits, BDO conducted a tour of the collection site facilities and gained an immersive understanding of the processes and staff required to collect, handle, and store end of life products, as well as visually identify the space required around and for each type of collection container including tub skids (plastic collection bins with integrated pallets), drums, and various cardboard boxes used for Product Care programs.

BDO collected further information relating to the number of staff required depending on seasonality and other variables, as well as cost information related to rent (where applicable), wages and other overhead expenses.



BDO observed that end of life products are generally received from consumers at collection sites in two ways:

- staff collected items from the consumer either at their vehicle or off a holding tray; or
- consumers sorted and placed items directly into the relevant receptacles.

In both cases, attention to contamination (e.g., placing products in the wrong collection container or receiving products not included under the program(s)) was clearly a priority, requiring staff to monitor the "Receive and Sort" process.

BDO observed staff collecting and sorting paint and household hazardous waste in the provided receptacles/collection containers², and then transferring full collection containers to storage areas. When ready, staff moved receptacles/collection containers from storage onto a truck for transportation.

Lightbulbs required some staff time to assist in sorting, and alarms required minimal effort due to the low volume, size of item, and simplicity of the program.

At some depots, the collection containers are not moved until they are picked up by the transporter. For others, once a collection container is full, staff transfer them to the storage area, where they may be stacked prior to pick up. Some collection sites add a label on each collection container at this time.

On pick-up day, staff use a forklift or hand lift (pallet jack) to move the stored materials from one location within the collection site to the loading station, where the staff operating the transportation service for Product Care load or assist in the loading of the materials on the truck.

For all collection sites observed, staff that are assisting in receiving, packaging, and storage processes for Product Care are also assisting with other EPR programs, and that no single staff member is dedicated solely to processing Product Care's programs. It was observed that at a collection site only one member of staff is needed to directly assist in all of the EPR programs offered.

It was also observed that storage can be located outside (in a sheltered area) to reduce space allocated within the facility's warehouse.

INTERVIEWS

BDO conducted interviews³ with a sample selection of five BC collection sites, with introductions made by Product Care. Five collection sites were selected as a stratified sample as there were limited respondents from the Product Care contracted collection sites across BC that were willing and able to participate in the in-depth analysis dimension of the engagement and provide the relevant information required to extrapolate data.

The sites that agreed to be interviewed, represented a reasonable and representational scan of typical operations, and appropriate within the scope and timeline for the study. The collection sites interviewed included:

- Three for-profit (bottle or return-it) collection sites;
- A single-sort⁴ (paper/packaging materials collected in a common collection container, to be sorted at a later time) non-profit recycling collection site; and
- A regular non-profit recycling collection site.

Product Care staff also interviewed an additional five collection sites. The collection sites interviewed represented urban and sub-urban regions. Based on the relative consistency of information obtained, the number of collection sites interviewed and visited was considered to be sufficient for the purposes and the desired outcomes of this report.

BDO enquired upon areas including:

- 1. An overview of the facility's operations;
- 2. The operations of collection and packaging of products for each of the in-scope programs;
- 3. The location and space of the facility as well as the space and location of collecting and storing the products;
- 4. Resourcing at the facility as well as specific staffing and skill requirements for handling the products;

² Receptacles are containers that consumers can place items in to be sorted by staff into collection containers that are supplied by the program.

³ Organizations that agreed to be interviewed and/or share financial and operational information are confidential and data is secure.

⁴ Single sort refers to paper fibers, plastics, metals, and other containers are mixed, instead of being sorted by the depositor into separate commodities (newspaper, paperboard, corrugated fiberboard, plastic, etc.)

- 5. Approximate time taken to perform the tasks necessary to collect and handle the products;
- 6. Equipment used at the facility and estimated allocation of equipment time for Product Care programs;
- 7. Costs related to space, staff and other overhead;
- 8. Perceived and realized benefits from offering the program; and
- 9. The collection site's overall perspective of the program value and compensation.

Most collection sites shared with BDO that offering Product Care programs has generated benefits and / or that it is a valuable addition to their facility for reasons including:



Four out of the five interviewed collection sites communicated a financial benefit from the Product Care programs, either through the direct compensation received, and/or indirectly through the increase of volume/customers resulting from offering the EPR programs available at their facility. Collection sites perceived they may not be generating a significant profit from the programs directly, however, the collection sites noted that the compensation was covering the associated costs.

The interviewees mostly noted that, although they were receiving some financial incentives, an increase in the compensation provided would be welcome, mostly due to the increasing costs of labour each year. Some collection sites thought that they were locked into 5-year agreements with the stewardship programs with little room for negotiation related to inflation, however it is noted that all Product Care agreements allow for termination without cause usually on 30 days' notice.

It was noted that the collection sites felt that the time taken to collect, package, store, and load products, as well as the space taken up by the programs were similar to that of other EPR programs offered; however, they did note that sorting and collecting paint and household hazardous waste items required more staff time than most other EPR programs. In addition, lighting required more staff attention to ensure that items are appropriately sorted into the correct receptacles and attention to avoid breakage. Significantly less time, effort, space, and resources were required for the alarms program, although that program was also not identified as a significant area of revenue due to volumes.

COSTING MODEL

BDO developed a cost model focused on quantifying the costs and benefits of the Product Care program from the perspective of the collection sites involved, as well as stress testing the overall gross margins and contribution margins under varying cost assumptions. In the following sections, we provide information on the structure and workings of the model, as well as a description of the assumptions that were used to determine the collection sites' revenues and costs.

1) MODEL DEVELOPMENT

MODEL BUILD PRINCIPLES

The Costing Model contains built-in dynamic features that allow for quick alteration of assumptions related to revenues and expenses, and an immediate re-calculation to see their impact on metrics of interest. The Costing Model was built based on data for 284 Product Care paid⁵ collection sites located across British Columbia. Product Care provided data including the number of tub skids, drums, boxes, and pieces respectively, of the recycled materials (Paints & Household Hazardous Waste ("HHW"), lighting products, and smoke/CO alarms) collected per year, total payments and segmented payments for each collection site, as well as the rate paid per container unit for the 533 collection sites. Within the 533 collection sites, 249 of them are not financially compensated, so only 284 collection sites are included in the consolidated analysis.

Based on the data provided by Product Care, there are typically 10 compensation rate categories depending on the program/product/collection container:

- 4 rates for Paint and HHW containers (depending on the container type and the product type),
- 2 rates for collection sites using standard size boxes (tube boxes and CFL "square" boxes),
- 3 rates for collection sites reimbursed based on piece count: CFL light bulbs and HID lamps are counted by piece, while linear tubes are counted by feet, and
- 1 rate for the standard smoke alarm boxes.

We consolidated specific "per unit prices" for all the different unit types from the Product Care data files (see below). Notably, the prices we listed below are general rates paid by Product Care to most collection sites. However, for all products there are exceptions at some collection sites, which we overrode on a case-by-case basis in the model to reflect the standard revenues, however the calculated total revenues in our model are within 0.1% of the actual Product Care data.

Revenues per Unit	
Paint & HHW	
Paint/Aero Paint Tub	\$45
Solvent/Pest/Aero Other Tub	\$120
Aero Paint Drum	\$10
Pest/Aero Other Drum	\$30
Lighting Products	
CFL Box	\$10
4'/8' Tube Box	\$5
Linear Tubes (per foot)	\$0.03
HID & Other Lamps (piece)	\$0.10
CFL & Bulbs (piece)	\$0.05
Smoke Alarm	
Alarm Box	\$50

<u>Table. 1</u>

⁵ Does not include the return to depot or other sites not remunerated by the program

Considering the rate system used, the revenues for each unit type at each collection site were calculated using the following formula:

Segment Revenues of Each Unit Type (\$/year) = Number of Units /year × Fee for the Unit (\$)/Unit

Total Revenues = Sum of all Segment Revenues

The direct costs quantified in the model as follows:

|--|

Direct Costs	Description	Calculation Method
Handling Cost	Manual Labour Cost associated with the preparation of the collection containers, specifically receiving materials, handling, quality control, paperwork, and customer interaction time	Handling Cost (\$/year) = Hourly Labour Rate(\$/hr) × Handling Time(hr/unit) × No of Units/year
Forklift Cost	Costs associated with the usage of forklifts for unloading supplies and loading trucks. The forklift cost includes embedded Capex & Operating costs, training costs for personnel, as well as the labor cost associated with operating the forklift. All of these costs are summed into an hourly cost associated with the operation of the forklift	Forklift Cost (\$/year) = Hourly Forklift Rate(\$/hr) × Forklift Time(hr/unit) × No of Units/year
Space Cost	Costs associated with the space used for storage (items received and packed), collection (receptacles for current collection), and supply (additional receptacles). A yearly average rent/sf is assumed depending on the area where each collection site is located: urban, suburban, small town, rural. This rent is assumed even if the building is owned, as a proxy for the opportunity cost of the space	Space Cost (\$/year) = (No of Storage Units + No of Collection Units + No of Supply Units) × Occupied Area(sf/unit) × Rent(\$/sf)/year

In addition to direct costs, we also considered overhead costs. The overhead costs included management and administration salaries, cleaning and maintenance, office rent, office equipment, accounting and legal, phone and utilities, miscellaneous, software and subscriptions, security, training, and insurance.

We estimated overhead based on sample financial statements and/or trial balances from two sample collection sites. The allocation of overhead to Product Care was determined pro-rata based on the ratio of Product Care revenues to total revenues. A "cap" was subsequently applied based on triangulating this information against other publicly available financial statements and/or statements from common-size companies/organizations that are as analogous as possible to the collection sites in question.

The model also considered an additional category of overhead called Idle Time, which accounts for time that handling (direct) staff are under-utilized.

The financial metrics that we focused on generating were:

- Gross Margin: the collection sites' net sales revenue minus their direct costs (also expressed as percentage of revenues)
- Contribution Margin: the collection sites' Gross Margin minus their overhead costs allocated to the Product Care program (also expressed as percentage of revenues).

2) MODEL STRUCTURE

BDO developed a cost model focused on quantifying the costs and benefits of the Product Care program from the perspective of the collection sites involved in the program, as well as stress testing the overall gross margins and contribution margins under changing cost assumptions. We followed commonly accepted management accounting and economic practices and applied an "Activity Based Costing" approach. Moreover, the model itself is dynamic, allowing users to view the impact of changing different assumptions on the calculated margins. In the following sections, we provide information on the structure and workings of the model, as well as a description of the assumptions that were used to build the inputs used in the model to determine the collection sites' revenues and costs.

The Collection site Cost Model has the following structure:

1. Model Dash

The Model Dashboard offers an overall picture of the revenues and costs by recycled product segments (Paint & HHW, lighting products, and smoke alarms) and collection site type (based on collection site tier, location type). The Model Dashboard also shows a more detailed overview of the cost and revenue structure for each collection site. A dropdown menu was used to select and display the estimated economics associated with an individual collection site.

2. Model Inputs

The Model Inputs tab contains a list of the main assumptions that go into the model (as an average for each input metric), as well as a scenario testing section, with a built-in scenario storage mechanism. These inputs are fed into the Collection site Model tab, for detailed calculation. The main categories of assumptions are:

- Revenues: This section contains inputs on the revenues per collection container unit (\$/unit), including Paint & HHW tub skids, drums, light boxes, loose light bulbs/lamps by pieces (then consolidated into large gaylords), and Alarm boxes.
- Labour Costs: This section is broken down into two main types of labour associated with sorting and packing the collection containers: manual labour, used for handling the collection containers (tubs, drums, boxes, and gaylords), and forklift labour. The user can specify both the hourly rate and average duration for each type of container and labour.
- Space Costs: This section contains inputs for the costs associated with the space required to store and collect the containers used in the Product Care program:
 - Product type:
 - A space of 16 square feet ("sf") is assumed to be needed for each paint & HHW tub skid and light bulb collecting gaylords;
 - 4 sf for a Paint & HHW drum.
 - Light boxes (of different shapes) and alarm boxes are assumed to need 4 sf and 2.8 sf in space.
 - Location type: the cost/sf is an average based on the location type for the collection sites: urban, suburban, small town, rural.
 - Volume tier: The average space needed for each collection site is quantified based on tiers (Tier 1, Tier 2, Tier 3, and Tier 4), which are related to the volume of products collected on average for each facility.
- Overhead Costs: This section contains inputs related to the overhead costs required to run the collection site and the portion of overhead that is allocated specifically to the Product Care program. The Overhead Costs associated with the operations of the collection sites are quantified based on tiers in a sheet called "Reconciliations". A percentage of the overall overhead is allocated to Product Care and varies based on tier (2.2% for Tier 1, 1.9% for Tier 2,

and 1.6% for Tier 3). A threshold maximum value of overhead ("cap"⁶) can be set in terms of a % of Cost of Goods Sold (COGS)/direct costs (labour and space costs).

The Model Inputs Sheet also contains a scenario storage mechanism, which allows for the dynamic testing of the revenues and costs of the Product Care program under changing sets of assumptions (e.g., handling time/container, space requirements, space costs, etc.). To the right of the scenario testing section, there is a brief output section, which displays average and total financial parameters (such as revenues, gross margin, contribution margin, etc.) by collection site size, based on the assumptions of the active scenario.

3. Collection Site Model

The Collection Site Model sheet is where all the detailed calculation and data analysis are completed based on inputs. The calculated results are then consolidated and populated in the Model Dash sheet.

3) METHODOLOGY & ASSUMPTIONS

The design of the Costing Model evaluates:

- (1) A base costing scenario using the recently collected data from the interviews, as well as additional market-research-driven data ("BDO Base Case"); and
- (2) An "inflationary" case, which takes the cost assumptions from the base case and applies an inflation index of 2% per year for 5 consecutive years to test the collection site margins under an increased cost structure and unchanged rate structure ("BDO Inflation Case") although the quantity collected by the program, and therefore the collection site revenue, has generally increased each year.

1) Forklift: Duration & Cost

The model uses a fully-loaded hourly cost for the forklift, which considers capex costs, maintenance costs, training costs, and labour, based on market research and interviews with collection sites.⁷

2) Direct Labour: Duration & Cost

The BDO cases use averages of the results of the interviews as an input for handling time, as well as for labour rates. In addition, we looked closely at the time motion study to compare and verify the metrics provided.

Notably, when utilizing interview data as one of the sources to calculate average handling time, we excluded apparent outliers to make sure the inputs were actually realistic. The example below shows that the answers for "Approximate time taken to handle a paint & HHW tub skid/drum" were "150 minutes (2.5 hours per day)" and "300 minutes (5 hours per day)" for Collection site A and B. Due to the wide range of answers given to the questions of approximate handling time for one collection container and given that video time motion evidence supported the lower answers provided by larger collection sites, we omitted the outlier responses from the model.

Approx. time taken to handle	Unit	Site A Rural	Site B Small Town	Site C Urban	Site D Urban	Site E Small Town
Paint & HHW- tub skids	min	150	300	14.5	17	No Data

Table. 3

⁶ The "cap" was calculated based on industry-wide financials as a benchmark to avoid overhead cost across any tier being over-estimated. While some small operators may have excessively high overhead costs, they should not be compensated for this. Our implicit assumption is that the depots should be able to achieve overheads that mirror the average for their industry. Note that even if overheads are elevated, the strong gross/contribution margins calculated by our model should be able to absorb a substantial amount of overhead—though of course we did not know this in advance. The financials are sourced through multiple entities and StatsCan.

⁷ As mentioned above, BDO conducted interviews with a sample selection of five BC collection sites, with introductions made by Product Care.

3) Space Costs & Collection Site Types by Location

Collection site classification is based on their location into the four major categories: urban, suburban, small town, and rural. Based on Product Care data, we determined the location/region of the collection sites. We then used census data to determine the population size in the area where each collection site is located. We then assigned a population range for each type of location as follows:

General Location Categories		
Location Type	Min Population	Max Population
Urban	150,000	3,000,000
Suburban	50,000	149,999
Small Town	10,000	49,999
Rural	-	9,999

<u> Table. 4</u>

The categorization was assigned to each collection site on the Collection site Model tab and resulted in the following distribution of collection sites by location.

<u>Table. 5</u>

No of Depots by Location Type		
Location Type	No of Depots	% of Depots
Urban	122	23%
Suburban	118	22%
Small Town	120	23%
Rural	173	32%
Total	533	100%

The model groups type of collection containers into 5 types given similarities in size, based on Interview data and pictures/videos collected at select collection sites. We specified the surface space required for each type of collection container and how many of the collection containers could be stacked in order to save occupied space. The table below shows the surface space and "stackability" of each container type.

Table. 6

Space Costs	Surface Space Required (sf)	# of Stackable Units
Paint Tub Skid	16.0	3.0
Paint Drum	4.0	1.0
Light Box (on average)	4.0	2.0
Light Gaylord	16.0	1.0
Alarm Box	2.8	2.0

The model then utilizes the interview data to determine how many skids/containers each collection site possesses on average based on collection site tiers (assuming all the collection sites in the same tier have the same number of skids/containers on average). The model also uses the collection site interview data to determine the average rental cost per square foot for the collection site facilities, based on their location types.

4) Collection sites by Tiers

This section is used to classify collection sites based on their total annual revenues into the four categories: Tier 1, 2, 3, and 4. Based on Product Care data, we determined the Tier type for each collection site, and then categorized each collection site on the Collection site Model tab.

Table. 7

Collection site Space Parameters	Tier 1	Tier 2	Tier 3	Tier 4*
Total Annual Revenues	>\$10,000	\$3,000-\$10,000	\$50-\$3,000	<\$50
Min Revenues	\$10,000	\$3,000	\$50	\$0
Max Revenues	n/a	\$10,000	\$3,000	\$50
No of Collection sites	55	63	128	287

*Note: The Tier 4 count of collection sites includes the 249 collection sites that generate \$0 of revenues. These collection sites are not included in the consolidated analysis (Net Tier 4 number of collection sites included in the analysis is 38, which was the basis for average calculation). See discussion above regarding unpaid collection sites.

5) Overhead Buildup

This section is used to determine the overhead allocation corresponding to the Product Care program. The main sources of information for this analysis were interviews with two sample collection sites.

We examined the financial statements for sampled facilities to determine the main overhead costs associated with each facility, as well as the percentage of revenues that the Product Care program represents compared to the total revenues of each collection site, a parameter that was used as a proxy for Product Care Overhead Allocation. Our selection of revenues as the allocation mechanism stems from the fact that we have no detailed information on total volumes of other programs at these collection sites, and even if we did, we would need to determine a means of weighting these different volumes. Thus, revenues are the "simplest" method here.

Since the sampled facilities we used are each in the Tier 1 and Tier 3 categories, we use them as inputs for Tier 1 and Tier 3 average overhead costs and to calculate the Product Care Overhead Allocation (percentage). We also assumed Tier 4's overhead allocation to Product Care programs is negligible, since they generate minimal revenues from Product Care. We then used linear interpolation between Tier 1 and Tier 3 to determine the overhead costs and Product Care Overhead Allocation (percentage) for Tier 2 collection sites.

To ensure that our methodology does not consider excessive overhead costs that go beyond the average range of overhead costs for a facility of this type, we considered a Maximum Overhead Cap parameter, expressed as a percentage of the direct costs for each collection site (See below, 35.6%). The overhead for each collection site cannot exceed the Maximum Overhead Threshold parameter. This parameter was determined by looking at StatsCan Financial Performance Data for Material Recovery Facilities, as well as the financial statements of several other waste management entities that were as analogous as possible to the collection sites in our model.

6) Collection Container Pick-up (from Storage), Collection, Supply

The space requirements for the Product Care program were evaluated by considering the average number of collection containers available per pick-up for each tier. We determined the total average number of collection containers used for each collection site tier from the Product Care interview data. The total average number of collection containers was further broken down into containers for pick-up (in storage, available for transport to Product Care), collection containers for active collection (used for customer collection), and supply collection containers (additional empty containers).

KEY OBSERVATIONS & FINDINGS

The next few pages summarize the key observations and findings and are organized by theme.

OBSERVATIONS & FINDINGS

The work performed, as summarized in the previous sections, identified the following key observations and findings, which are analyzed in 2 scenarios.

Scenario: BDO Base Case

The BDO Base Case assumed an average overhead cost per tier, limited by the maximum overhead threshold (35.6%), as well as space and labour assumptions arising from either interview information, a BDO motion study based on the videos, interviews, or market research.

<u> Table. 8</u>

Case	BDO Base Case			
Labour Rates				
Manual Labour (\$/hr)				\$19
Forklift Labour (\$/hr)				\$44
Average Handling Time / Collection Container	Paint & HHW Tub	Light Box	Light Gaylord Skid	Alarm Box
Total Handling (min)	16	10	26	6
Average Forklift Time / Collection Container	Paint & HHW	Light Box	Light Gaylord	Alarm Box
Moving & Loading skids (min)	2 975	0.275	2	0.25
Moving a Loading skids (min)	5.075	0.375	3	0.25
Space Needed	Tier 1	Tier 2	Tier 3	Tier 4
Collection to Storage Ratio - Big Containers*	1.30	1.29	1.25	1.00
Supply to Collection Ratio - Big Containers	0.77	0.78	0.80	1.00
Collection to Storage Ratio - Small Containers	0.57	0.59	0.64	1.00
Supply to Collection Ratio - Small Containers	0.58	0.62	0.69	1.00
Space Cost	Urban	Suburban	Small Town	Rural
Annual cost/sf	\$21	\$17	\$15	\$13
Overhead Costs	Tier 1	Tier 2	Tier 3	Tier 4
Maximum Overhead Threshold (% of Direct Cost)	35.6%	35.6%	35.6%	35.6%
Avg** Overhead Costs	\$490,390	\$284,236	\$78,082	-
PC Overhead Allocation (%)	2.2%	1.9%	1.6%	-

*Big containers include paint & HHW tub skids, paint & HHW drums, and light gaylords. Small containers include all the light boxes and alarm boxes

**Averages for Tier 1 and Tier 3 categories were calculated based on historical financials from sampled facilities. We also assumed Tier 4's overhead allocation to Product Care programs is negligible, since they generate minimal revenues from Product Care. We then used linear interpolation between Tier 1 and Tier 3 to determine the overhead costs for Tier 2 collection sites

The BDO Base Case results in average gross margins of 64.5% and contribution margin (after overhead) of 52.4% across all three programs. Overall, Tiers 1 through 3 seem to maintain robust margins, whereas Tier 4 collection sites on average seem to have negative gross margins and contribution margins, but this is with reference to \$50 or less of annual revenue from the Product Care programs.

Tier 4 collection sites are generally are collection sites which participate with the programs in order to ensure the proper management of the small quantities collected, such as many remote First Nations sites, and are generally not participating for "business purposes".

BDO Base Case					
Average Parameters per Tier	Tier 1	Tier 2	Tier 3	Tier 4	Total
Paint & HHW Revenues*	\$16,624	\$3,345	\$465	(\$45)	\$1,182,852
Lighting Products Revenues	\$5,623	\$1,655	\$562	-	\$485,425
Smoke/CO Alarms Revenues	\$1,003	\$137	\$10	\$3	\$65,200
Total Revenues	\$23,250	\$5,137	\$1,037	(\$42)	\$1,733,476
Direct Costs	\$7,453	\$1,869	\$483	\$675	\$615,052
Handling	\$2,848	\$687	\$160	\$245	\$229,715
Forklift	\$1,218	\$259	\$46	\$59	\$91,422
Space	\$3,386	\$923	\$277	\$372	\$293,916
Gross Margin	\$15,797	\$3,268	\$554	(\$717)	\$1,118,424
Gross Margin (%)	67.9%	63.6%	53.4%	NA	64.5%
Overhead	\$2,655	\$666	\$172	-	\$209,976
Contribution Margin	\$13,142	\$2,602	\$382	(\$717.2)	\$908,448
Contribution Margin (%)	56.5%	50.7%	36.9%	NA	52.4%
Net Revenue/Container Unit	\$40	\$34	\$28	(\$1)	\$35
Total Cost/Container Unit	\$17	\$17	\$17	\$10	\$17
Total Parameters per Tier	Tier 1	Tier 2	Tier 3	Tier 4	Total
No of Collection sites Participating**	55	63	128	38	284

Table. 9

*Paint & HHW Revenues are net of Penalties

**Excluded Collection sites with no compensation

As shown in the chart below, a breakdown of revenues and costs by Tier shows healthy margins for Tier 1 through 3, indicating that collection sites with higher volumes/revenues tend to have healthier margins.



Average Revenue & Cost by Tier



A breakdown of revenues and costs by Business Type is shown below, indicating that Not-For-Profit depots generate higher margins. Public depots appear to be generating the lowest margins.



Chart. 2



A breakdown of the gross margins by collection sites shows the following distribution: Chart. 3

When looking at the cost structure, the Space Costs seem to be the largest component across the tiers, followed by Handling and Overhead Costs. The Forklift Cost seems to be the lowest component across tiers. All of these costs also scale naturally with the volume of the collected volumes and categories: e.g., Tier 1 collection sites have the highest volumes and also the highest Space Cost, Handling Cost and OverheadCost.





We also look at margin performance for the 3 product type segments - paint & HHW, lighting, and alarms. As shown in the chart below, a breakdown of revenues and margins by product types shows alarms generate the highest margins, largely due to their low footprint. Lighting products generate the lowest margin, which is associated with a relatively longer handling time received.





When we look at Penalties (for placing products in the collection container that are not included in the program) associated with paint & HHW collection, it appears the Penalties account for 7.5%, 6.4%, and 9.5% of paint & HHW gross revenues for Tier 1 to 3 collection sites, respectively. However, the penalties appear to be higher than gross revenues for smaller collection sites in Tier 4, however as noted, Tier 4 collection sites are generally very low volume sites that have requested to participate. It is noted that non-program materials are an expense that adds to the program costs and the wording of the Recycling Regulation specifically refers to "the costs of collecting and managing products within the product category covered by the plan".

Product Line Analysis

We also analyzed revenue and margin performance independently under each product line: paint & HHW, lighting products, and smoke/CO alarms. The findings are presented as below.

Chart. 6



Paint & HHW - Average Revenue & Cost by Tier





Chart. 8



As shown in the charts above, for paint & HHW product line, average net annual revenues for Tier 1 to Tier 4 are \$16.6k, \$3.3k, \$465 and (\$45) respectively. The negative revenues for Tier 4 were due to the penalties from the Paint program.

For the lighting product line, average net annual revenues for Tier 1 to Tier 4 are \$5.6k, \$1.7k, \$562 and \$0 respectively.

For the smoke/CO alarm products, average net annual revenues for Tier 1 to Tier 4 are \$1k, \$137, \$10 and \$3 respectively.

The product-line-specific analysis of revenues and margins also confirms our aforementioned findings that alarms generate the highest margins, while lighting generates the lowest margin.

Scenario 2: BDO Inflationary Case

The BDO Inflationary Case was built to stress-test the business margins for inflationary costs under a constant revenue stream, by applying 2% inflation for five years while keeping the operational parameters constant.

<u>Table. 10</u>				
Case*	BDO Inflationary Case in 5 Years			
Labour Rates				
Manual Labour (\$/hr)				\$21
Forklift Labour (\$/hr)				\$48
	Detter Collumn			
Average Handling Time / Collection Container	Tub	Light Box	Light Gaylord Skid	Alarm Box
Total Handling (min)	16	10	26	6
	-			
Average Forklift Time / Collection Container	Paint & HHW Tub	Light Box	Light Gaylord Skid	Alarm Box
Moving & Loading skids (min)	3.88	0.38	3	0.25
Space Needed	Tier 1	Tier 2	Tier 3	Tier 4
Collection to Storage Ratio - Big Containers	1.30	1.29	1.25	1.00
Supply to Collection Ratio - Big Containers	0.77	0.78	0.80	1.00
Collection to Storage Ratio - Small Containers	0.57	0.59	0.64	1.00
Supply to Collection Ratio - Small Containers	0.58	0.62	0.69	1.00
Space Cost	Urban	Suburban	Small Town	Rural
Cost/sf	\$24	\$18	\$16	\$14
Overhead Costs	Tier 1	Tier 2	Tier 3	Tier 4
Maximum Overhead Threshold (% of Direct Cost)	35.6%	35.6%	35.6%	35.6%
Avg Annual Overhead Costs	\$541,430	\$313,819	\$86,209	-
PC Overhead Allocation (%)	2.2%	1.9%	1.6%	-
Inflation Index	110.4	% *Assume	Inflation of 2% per	year for 5 Years

As a result of cost increases, the margins decrease with the gross margin averaging 61.0% and the contribution margin averaging 47.7%, but without taking into account the average increase in quantity collected/revenue earned.

<u> Table. 11</u>

BDO Inflationary Case					
Average Parameters per Tier	Tier 1	Tier 2	Tier 3	Tier 4	Total
Paint & HHW Revenues*	\$16,624	\$3,345	\$465	(\$45)	\$1,182,852
Lighting Products Revenues	\$5,623	\$1,655	\$562	-	\$485,425
Smoke/CO Alarms Revenues	\$1,003	\$137	\$10	\$3	\$65,200
Total Revenues	\$23,250	\$5,137	\$1,037	(\$42)	\$1,733,476
Direct Costs	\$8,190	\$2,053	\$532	\$745	\$676,269
Handling	\$3,113	\$759	\$176	\$270	\$251,854
Forklift	\$1,345	\$286	\$51	\$65	\$100,937
Space	\$3,732	\$1,009	\$305	\$410	\$323,478
Gross Margin	\$15,060	\$3,084	\$505	(\$787)	\$1,057,207
Gross Margin (%)	64.8%	60.0%	48.7%	NA	61.0%
Overhead	\$2,918	\$731	\$190	-	\$230,833
Contribution Margin	\$12,142	\$2,352	\$315	(\$787.4)	\$826,374
Contribution Margin (%)	52.2%	45.8%	30.4%	NA	47.7%
Net Revenue/Container Unit Total Cost/Container Unit	\$40 \$19	\$34 \$18	\$28 \$19	(\$1) \$11	\$35 \$18
Total Parameters per Tier	Tier 1	Tier 2	Tier 3	Tier 4	Total
No of Collection sites Participating**	55	63	128	38	284

*Paint & HHW Revenues are net of Penalties

**Excluded Collection sites with no compensation

This suggests that collection sites that have efficient operations can sustain healthy margins long-term despite an increase in their cost structure and flat revenues which may in any event be more than offset by average annual quantity collected/revenue earned increases.

CONCLUSION

Our cost model evaluated the ability of a recycling program to cover their program's direct costs as well as contribute in a reasonable manner to overhead expenses. The cost model generated by BDO (BDO Base Case) assumed an average overhead cost per tier (with collection sites tiered by weekly volumes), limited by a maximum overhead threshold, as well as space and labour assumptions arising from either interview information, relevant time motion studies, interviews, or market research.

Our on-site and interview research highlighted that many collection sites and recycling facilities acknowledged that although they do not believe the program generates a significant profit, there are many benefits to having the Product Care programs in addition to the compensation and that the program added value to their facility.

Despite the impressions of the facilities regarding profitability of the programs, as mentioned above, the BDO Base Case resulted in an average positive gross margin of 64.5% and a contribution margin (after overhead) of 52.4%. Gross margins for paint & HHW, lighting products, and smoke/CO alarms are 65.7%, 58% and 92.2%, respectively, while contribution margins for the 3 programs are 53.8%, 45.1% and 81.6% respectively. Overall, collection sites that generate more than \$50 in revenues (in our analysis, "Tiers" 1 through 3) seem to maintain robust margins, whereas Tier 4 (negligible revenues) are not able to cover their costs, though the costs are also negligible.

In light of the fact that our contribution margin calculation includes absorption of overhead (including staffing, insurance, accounting, legal, utilities, etc.) and essentially omits only interest and income tax costs, we conclude that the Product Care compensation for paint & HHW, lighting products and smoke/CO alarms handling at the Tier1-3 collection sites is adequate relative to their costs.

Our cost model operated on the reasonable assumption that every program, including each of the Product Care programs, should be able to cover the proportional overhead expenses. If we were developing an internal activity-based costing model, we would follow this principle. The cost model generated by BDO (BDO Base Case) assumed an average overhead cost per tier (with collection sites tiered by weekly volumes), limited by a maximum overhead threshold, as well as space and labour assumptions arising from either interview and on-site information, relevant time motion studies, or market research.

For collection sites to realize more financial and operational benefit from the compensation received, we have identified several process efficiencies from our observations.

- Continued program education and clear and simple posters to highlight the key factors to filter and sort for both staff and end users / customers to reduce contamination and penalties as well as re-work from re-sorting products. Education is the responsibility and accountability of the producers, municipalities, and collection sites directly, as well as indirectly the programs. Education and awareness can be enhanced through collaboration to deliver a consistent message.
- 2) Transparency and sharing of information between collection sites could improve costing and optimize procedures for recycling (including for receiving, handling, storing, shipping, etc.)