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BRITISH COLUMBIA

Performance Measurement for Extended Producer Responsibility in British Columbia

March, 2017

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Introduction & Executive Summary

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Introduction

- The Ministry of Environment engaged Deloitte to conduct a review of performance monitoring practices for Extended Producer Responsibility (EPR) in other jurisdictions and to identify practices that could be considered for EPR programs in BC
- This report presents the results of this work in the following sections:

1) **Executive summary**
2) **Project context, approach and outputs**
3) **Jurisdictional scan** – overview and selected observations
4) **EPR Programs in BC** – summary observations and recommendations
5) **Appendix A** – EPR programs in British Columbia

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Executive Summary
Context, Objectives and Approach

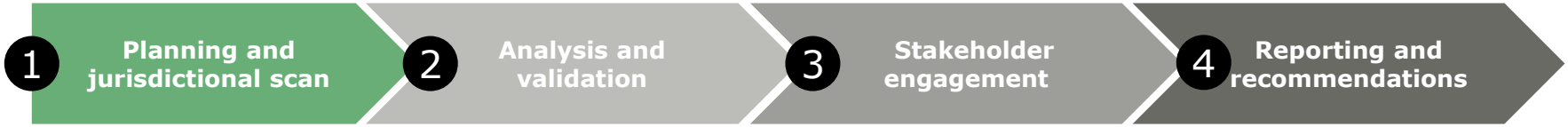
Context

- The Ministry of Environment is seeking to enhance its ability to monitor the performance of stewardship programs in the province by identifying and monitoring relevant, program-specific measures

Objectives

- Support the identification of relevant, meaningful performance measures for BC EPR programs based on a scan of practices in other jurisdictions and on engagement with representatives of programs in the province
- Develop an approach to support the identification and implementation of performance metrics that are meaningful and address the unique lifecycles, risks and uses of individual product types

Overview of approach



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Executive Summary

Key observations and recommendations (1)

Observations	Recommendations
• The approach to performance measurement should align with the unique lifecycle, risks and uses of individual products	• Align performance measurement approach to "categories" of like products • These categories can group similar product types (in terms of product lifecycles, risks and uses) and support the development of performance measures that more accurately reflect program effectiveness • Proposed categories include short-life products, long-life products and consumables
• Recovery Rate is a key metric, but does not provide a complete measure of performance for all product categories	• Retain Recovery Rate as a metric, and for select product categories, develop additional measures to augment Recovery Rate in order to provide a more complete assessment of program performance • This can include incorporating additional studies related to unaccounted-for products, comparability studies (to equate counts of products sold to weights of products captured), products consumed in use and products retained in households or businesses • This can also include more frequent and representative environmental assessments (landfill audits, wastewater studies) as a mechanism to a) establish and monitor recovery rates (i.e., through waste audits) and b) as a detective measure to identify leakage in existing programs so that issues can be detected and remedied in a more timely manner
• A risk-based approach to the development of program-specific measures and reporting requirements can align reporting to key drivers of program performance	• Incorporate a product lifecycle risk assessment into the process for identifying appropriate performance measures for EPR programs • Identify key drivers that influence program performance • Develop metrics (and targets, where applicable) that align with risks and drivers for each program • Align reporting requirements to key risks and drivers associated with each program in order to obtain a more comprehensive understanding of performance, strengths and opportunities for improvement

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Executive Summary

Key observations and recommendations (2)

Observations	Recommendations
• A risk-based approach to program oversight can support alignment of Ministry resources to priority programs and issues	• Employ a risk-based approach to Ministry oversight of EPR programs (see for example, the draft assurance report assessment template) • Assess inherent risk of each program (as a function of inherent environmental risks associated with the products, program compliance history and emerging issues or trends related to products) • Align oversight and compliance activities to the level of risk associated with each program, where possible
• There is some inconsistency in the use of certain performance measures, making comparison across programs challenging	• Continue to support standardization of terminology and assurance criteria and utilize agreed-upon definitions (e.g., from CSA or other bodies) where appropriate
• Competing programs both within and across product types create barriers to effective performance measurement	• Evaluate potential to facilitate consolidation of data at a provincial level in order to roll up consistent performance metrics in stewardship plans and address inter-program challenges.

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Project Context, Approach and Outputs

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Project context and objectives

Context

- In the spirit of continuous improvement, the Ministry of Environment is seeking options to enhance its ability to monitor the performance of EPR programs in the province
- Specifically, this involves supporting the definition of meaningful and measurable performance metrics that are relevant to each program in order to enable effective oversight and to support tracking of progress towards specific program targets

Objectives

Deloitte was engaged to support this initiative through the following activities:

- Conduct a scan of performance metrics used in other jurisdictions to identify leading practices
- Understand how other jurisdictions have approached performance measurement and monitoring of EPR programs and what practices could be relevant to BC-based programs
- Identify relevant leading practices to address known challenges and complexities associated with EPR performance monitoring in BC

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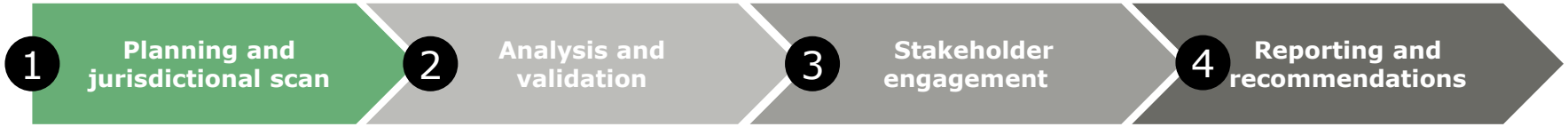
Overview of approach



Key Activities

1 Planning and jurisdictional scan	2 Analysis and validation	3 Stakeholder engagement	4 Reporting and recommendations
1. Confirm scope, timing and project outputs with MOE team 2. Conduct initial review and validate key criteria and jurisdictions selected for jurisdictional scan with MOE team 3. Review relevant documentation including: • Guidance documents • Research reports • Stewardship websites, annual reports, and reports that define reporting requirements	1. Evaluate findings and identify strengths and weaknesses from jurisdictional scan 2. Document results and draft recommendations for BC EPR programs 3. Engage Deloitte SME's to validate results 4. Present findings to MOE team through a working session to validate	1. Conduct interviews with relevant stewards and program stakeholders to confirm report recommendations for BC's EPR programs 2. Review feedback from EPR programs 3. Analyse and document feedback from stakeholders and update report accordingly	1. Draft final report 2. Validate final report with MOE team 3. Refine report as required 4. Present final report

Outputs

1 Planning and jurisdictional scan	2 Analysis and validation	3 Stakeholder engagement	4 Reporting and recommendations
• Confirm project objectives and work plan • Confirm "key questions" to be addressed and jurisdictions within scope of jurisdictional scan • Initial jurisdictional scan results	• Jurisdictional scan results matrix • Initial draft of report with performance metrics review and recommendations	• Updated draft report with refined recommendations based upon stakeholder input	• Draft Final Report • Final Report

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Project outputs and program-specific recommendations

Outputs

- Summary of selected EPR performance monitoring practices from relevant jurisdictions
- Summary of challenges and recommendations related to performance monitoring in BC's EPR programs
- Considerations and recommendations for individual EPR programs in BC

Program-specific recommendations – Disclaimer

- The program-specific recommendations outlined in this report are based on:
    1) a jurisdictional scan of relevant practices in other jurisdictions
    2) observations regarding challenges in EPR performance monitoring in BC
    3) feedback received from individual programs through one interview and input submitted electronically
- These recommendations are designed to inform discussions regarding opportunities to enhance performance reporting in these programs; however, it should be noted that any updates to performance measures must address the unique operating model, product characteristics, stakeholder dynamics, risks and opportunities associated with each individual program
- These recommendations are intended to support the continuous improvement of performance monitoring for these programs, but it is recognized that additional analysis by both the programs and the Ministry of Environment are needed to identify and implement new metrics that improve performance monitoring while balancing cost and complexity

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Glossary

Capture Rate - The amount of product collected as a percentage of the amount of targeted product available for collection.

Consumption and Use Method - Determines the amount of target product/material that an average household contains as the basis to predict the total amount of target product potentially available for collection.

Discard Model - A model developed to estimate the amount of products that are available for collection in the Canadian context.

Diversion Rate - The amount of product collected relative to amount of product in a waste stream (percent or other measure).

ELV - End-of-life vehicle.

EOL - The point in a material or product's life cycle at which it reached the end of its useful life.

EPR - Extended producer responsibility.

Market Supply Method - Uses historical sales data and average product life span assumptions to calculate expected waste product for a given year.

PRO - Producer responsibility organization.

Recovery Rate - The amount of product collected (in a calendar year) divided by the amount of product generated (in that calendar year), expressed as a percentage.*

Recycling Rate - The amount of material recycled as a percentage of the amount of targeted material collected (inbound) minus reuse and shrinkage. The Recycling Rate must reflect the net mass balance of all processing of that material, not simply one service provider's gate-to-gate efficiency rate. The boundary for measurement of recycling efficiency will differ by program according to the nature of materials, markets and processing methods.**

Saturation Model - Assumes that ownership of the target products in private households or industrial, consumer or institutional establishments is saturated and that for each new sale of the targeted product, the replaced product reaches its end-of-life and is discarded. The model requires only new sales of products that are placed on the market.

SME - Subject matter expert.

Stewards - Refers to the organizations participating the in the British Columbia Ministry of Environment EPR program

Waste Auditing - Auditing of the residential, industrial, commercial, and/or institutional waste streams (both recycling and disposal streams) can also be conducted to determine total tonnage of obligated waste materials or products that are expected as "available for collection" in a given reporting year.

WEEE - Waste electrical and electronic equipment.

*CSA defines Recovery Rate: The amount of material recovered for energy uses, which are not considered as reuse or recycling, as a percentage of the amount of targeted material collected minus reuse and shrinkage. The Recovery Rate must reflect the net mass balance of al processing of that material, not simply one service provider's gate-to-gate efficiency rate.

**CSA defines Recycling efficiency rate: The amount of material recycled as a percentage of the amount of targeted material collected (inbound) minus reuse and shrinkage. The recycling efficiency rate must reflect the net mass balance of all processing of that material, not simply one service provider's gate-to-gate efficiency rate.

Sources:
1. http://shop.csa.ca/en/canada/life-cycle-assessment/spe-890-15/invt/27038462015
2. http://www.ppec-paper.com/pdfFiles/factsheets/factsheet21-2011.pdf
3. https://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=9833A7B7-1&offset=4&toc=show
4. http://208.93.239.103/files/5513/5611/6423/Data_Requirements_Final__for_posting_Aug_20_2010.pdf

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Guiding principles and assessment criteria help identify the most appropriate metrics from the many in use

The following principles and criteria guided the assessment of performance measures and the merit of potential options. They functioned to clarify the decisions and trade-offs required in developing an extended producer responsibility performance measurement framework.

Guiding principles	
1	No single metric can tell the performance story; a balance of perspectives is required
2	Fewer metrics that are meaningful and relevant are preferable to many (particularly where metrics are not aligned with the unique characteristics of a given program)
3	Assessment criteria can be used to identify and evaluate priority metrics (see below)

Assessment Criteria for Metrics	
1	Performance metrics align to program risks, performance drivers and environmental objectives
2	Metrics are quantitative and auditable (recognizing there is value in qualitative metrics for some programs)
3	Metrics provide a framework for target-setting and continuous improvement
4	Metrics are based on available, objective data that can be collected and tracked in a cost-effective manner (i.e., the benefits of reporting and monitoring outweigh the costs of data collection)
5	Where possible, metrics support comparability across programs
6	Metrics support and promote best EOL / end-fate management option

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Jurisdictional scan

Overview and selected observations

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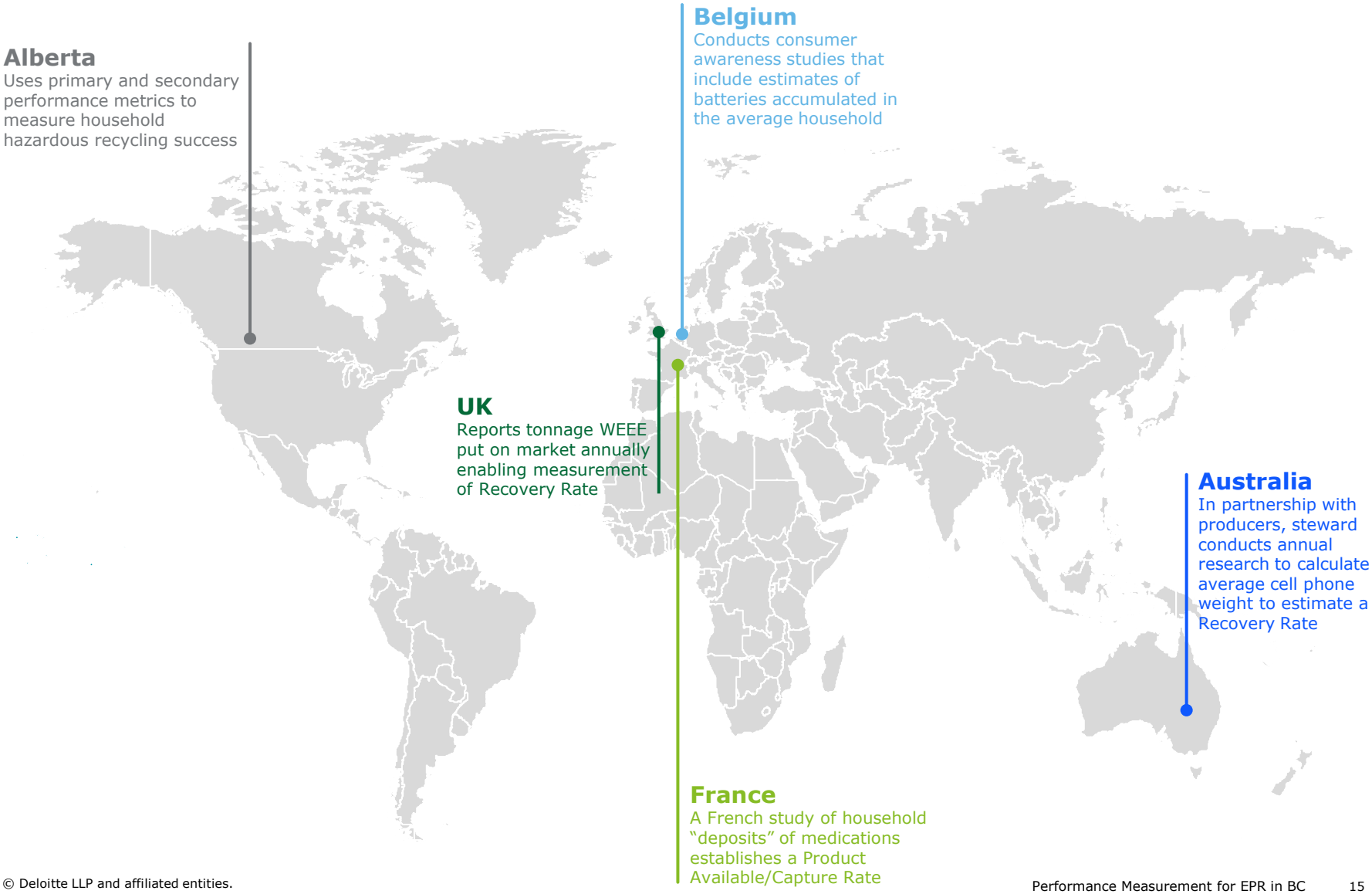
What can we learn from others?

Selective examples of effective practice



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Jurisdictional scan
Objectives

- BC is a recognized leader in EPR program development and implementation in Canada[1] and internationally
- While several components of the program are viewed as performing effectively, the Province also recognizes that there is an opportunity to enhance performance monitoring for programs in BC
- A jurisdictional scan was undertaken to identify leading practices related to performance monitoring in other jurisdictions that could be considered for application in BC (recognizing that any such practices would have to be adapted to the unique program structures and regulatory environment in BC)
- The key objectives of scan were to:
  - Conduct a scan of performance metrics used in other jurisdictions to identify leading practices
  - Understand how other jurisdictions have approached performance measurement and monitoring of EPR programs and what practices could be relevant to BC-based programs
  - Identify relevant leading practices to address known challenges and complexities associated with EPR performance monitoring in BC

1. See for example: EPR Canada, 2015. 2014 Extended Producer Responsibility Scorecard. In this report BC was recognized with the highest-rated EPR program in Canada

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Jurisdictional scan

Selection criteria and jurisdictions included

As there are dozens of EPR programs in operation globally, it was necessary to target the jurisdictional scan to focus on regions with:

- Recognized leadership in EPR program development and delivery
- Long-standing programs that have clear performance outcomes and have demonstrated improvement over time
- Effective performance management regimes (including target setting, reporting and verification)

Through discussions with the Ministry, the following jurisdictions were selected:

European Union	Other
France	Australia
Netherlands	United States
UK	Canada (Alberta, Ontario)
Belgium	
Spain	

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Jurisdictional scan
Approach

1. Initial Desktop research

- Government and municipal websites
- Stewardship program annual and non-financial reports
- Academic literature and EPR-specific studies (stewardship studies)

2. Consultation and validation with Deloitte SMEs

- Consultation with Deloitte EPR SMEs and authors of recent, relevant studies regarding EPR (e.g., Bio Deloitte's "Development of an Extended Producer Responsibility" for the European Commission)

3. **Analysis and assessment**

4. **Validation and report writing**

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Jurisdictional scan
Results

The results of the jurisdictional scan are presented in two sections:

1. In this section, we have summarized selected EPR programs in place in several jurisdictions with a focus on:
    - Describing the products for which EPR schemes are in place
    - Providing examples of performance monitoring practices, by product or product category[1]
2. Specific details regarding individual EPR program performance metrics are included in the subsequent section, where we describe current performance reporting challenges for BC programs and provide potential options to address them (with reference to other jurisdictions where appropriate)

1. Below we describe selected EPR programs from six of the jurisdictions reviewed in this study. For simplicity, in this section we have selected examples from jurisdictions and programs that are most relevant to EPR programs in BC. Where appropriate, we reference additional, relevant practices from other jurisdictions in the section that includes program-specific recommendations.

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Jurisdictional scan

Considerations related to jurisdictional scan information

- Jurisdictional scans offer the potential to identify leading practices for consideration in BC
- However, it is necessary to validate that these practices align with the specific regulatory and operational context of EPR programs in the province
- In gathering information from relevant jurisdictions, several challenges were identified when assessing relevance for BC:
  - **Unique regulatory models**
    - Regulatory models operate at multiple levels across jurisdictions (provincial/state, National and supra-national) imposing unique requirements and challenges in each jurisdiction
    - Mechanisms for performance monitoring (target setting, reporting requirements and frequency, requirements for assurance, etc.) vary significantly across jurisdictions
  - **Unique structure of EPR programs**
    - Across jurisdictions, the products included under EPR regulations vary
    - The structure of programs varies significantly across jurisdictions (for example, some jurisdictions combine multiple products or product categories under a single program, while others mandate programs that are specific to individual products)
  - **Lack of consistently-reported, comparable performance data across jurisdictions**
    - Numerous studies have highlighted challenges related to benchmarking performance data across jurisdictions
    - Data availability, variable data definitions, inconsistent calculation methodologies and variability in scope of reported metrics (among others) mean that inter-jurisdictional comparisons must account for local context

Recognizing these limitations is important when identifying practices for consideration within BC

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EPR programs in other jurisdictions

France

Population	66M
# of Programs	14

EPR Scheme	Observations
Household packaging	• Two main household packaging EPR schemes under one parent organization. EPR schemes for residential packaging recycling. • National material and organic recycling target of 75%.[1] • 2% reduction in fees for packaging incorporating eco-design principles or containing information on proper sorting of consumer waste.[1] • A 50% increase in fees for produces who's packaging cannot be recycled or has features that disrupt final recycled material quality.[1]
Pharmaceuticals	• One main EPR scheme, Cyclamed, for pharmaceutical collection. • Cyclamed's annual report identifies limitations of "Recovery Rate" as a performance measure for Consumable products. • Annual household deposit study supports estimate of "Product Available" for Collection and 64% Capture Rate (2015)[2]. • Annual awareness survey reports detailed trends by region and demographic. This includes "level of awareness" and "behavioral trends" by demographic (e.g. people aged 55-65 "always" return unused medications to collection point, etc.)[2]. • Recent demonstrated decline household inventories due to reduction in prescriptions/drug consumption and increase in returns. "The annual 'deposit mass' of French household deposits fell by 200 tonnes between 2014 and 2016, while the number of households increased by 500,000."[2]
WEEE	• WEEE collection is separated into household and professional waste collection schemes. Each with four major Producer Responsibility Organizations (PROs) that cover all WEEE categories collectively. • Measures Recovery Rate and Reuse/Recycling Rate based of quantities of WEEE put on the market annually and the quantities collected.[3] • Household WEEE PROs collectively created an organization called Eco3e, to help producers of electronics understand the benefits of eco-design and supporting its integration into the production process.[3] • Operates a data clearinghouse for household and professional WEEE providing one organization to gather metrics and share costs of consumer awareness.

Existing EPR Schemes

- ELV
- WEEE
- Batteries & accumulators
- Household packaging
- Fluorinated refrigerant fluids
- Pharmaceuticals
- Lubricants
- Tires
- Graphic paper
- Textiles
- Infectious healthcare waste
- Furniture
- Disbursed hazardous waste
- Gas canisters

1. Eco-Emballages, Annual Report 2015
2. Cyclamed, Annual Report 2015
3. Deloitte France, WEEE EPR Case Study France, 2012

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EPR programs in other jurisdictions
Netherlands

Population	17M
# of Programs	6

EPR Scheme	Observations
WEEE	• All WEEE is grouped under one EPR scheme (Wecycle) and sets targets and reports metrics separately by product category. • The Wecycle WEEE program separates program reporting by various categories of WEEE such as white goods (large household appliances), brown goods (electronics), IT (cell phones and small portable mp3 players etc.), LED lighting and blubs and small appliances. [1] • Reporting includes annual weight (in kg) of product put on the market from members and weight (kg) collected. Using these values, Recycling, Recovery and Energy Recovery Rates are calculated[1]. • Wecycle worked with third party consultancy, Pré, to measure total environmental and climate change performance impacts through the electronics and lighting recycling program[1].
Batteries	• One EPR scheme (Stibat) for battery collection. Target Collection Rate of 45% for 2016 (same as EU Batteries Directive). • The portable battery collection system collaborates with Auto Recycling Nederland, the organization that collects ELVs and automotive batteries. • Schools are heavily involved as collection points, and involved with battery collection education for students[2]. • Reports on YOY collection volume and Recycling Rate of battery categories[2]. • Using an Ecotest scan, the steward evaluates the performance of the recycled raw materials, CO2 emissions avoided, emissions toxicity and eutrophication[2]. These values are included in the annual report.

Existing EPR Schemes

- Batteries (portable and automotive)
- WEEE
- Household packaging
- ELV
- Tires
- Graphic paper
- Window panes

1. Wecycle, Facts & Figures 2015
2. Stibat, Annual Report 2015

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EPR programs in other jurisdictions

United Kingdom

Population	64M
# of Programs	5

EPR Scheme	Observations
WEEE	• There are over 29 WEEE EPR schemes in the UK, with two main collection systems (Producer Compliance Scheme and Distributer Take-Back Scheme) • Each has multiple stewards creating a highly competitive market, which neutralizes the effect of the economies of scale. • Performance indicators for WEEE measured include: Quantity put on the market (tonnes), collection total (tonnes) and Recycling Rate.[1] • Several Producer Compliance Schemes also collect batteries and packaging, creating synergies between product recycling programs.
Household packaging	• There are over 30 EPR schemes in the UK for household packaging recycling. Data is managed via The National Packaging Waste Database. • Overall packaging targets from 2013-2017 include a Recovery Rate of 78% (2016)[2] with individual targets per sub-product category. • The Courtauld Commitment is a voluntary agreement by the UK's Waste and Resources Action Programme (WRAP) for retailers, brands manufacturers and suppliers with the objective to reduce packaging waste.[2] • Programs report quantities put on to the market (kg per inhabitant), Recycling Rate and Recovery Rate for program performance.[2]

Existing EPR Schemes

- Batteries
- WEEE
- Packaging
- ELV
- Hazardous substances

1. Deloitte France, WEEE EPR Case Study UK, 2012
2. Deloitte France, Packaging EPR Case Study UK, 2012

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EPR programs in other jurisdictions

Belgium

Population	11M
# of Programs	11

EPR Scheme	Observations
Used Oil	• Two main used oil EPR schemes, Valorulb for non-edible oils and Valorfrit for edible oils. Municipalities are responsible for the collection of oils and are reimbursed by the PROs. • Non-edible oil Recycling Rate targets between 60-85% depending on region. Collection Rate targets for regions is between 90-100% of product available for collection[1]. • EPR programs gather performance data from collectors that includes: Collection Rate and treatment modes[1]. Quantities put onto the market/inhabitant are reported as well as Collection Rates and Recycling Rates of the processed oil.[1] • Assurance is conducted on non-edible oils through sample audits by a third-party auditor.
Batteries	• One main EPR scheme for battery recycling in Belgium (Bebat). • Bebat conducts annual consumer awareness studies. Results from these studies include the number of batteries (new/in use/empty) on average in each home, location of batteries in homes, number of times used batteries are returned in a year, % of consumers aware of the program, % who use collection facilities, and % who throw batteries into domestic waste[2]. • Conducted a 2015 study to measure % of batteries that end in the domestic waste landfill to further guide program initiatives such as consumer awareness campaigns. [2]
WEEE	• Primary WEEE scheme (Recupel) includes refrigerators and freezers, large household appliances (washing machines, dishwashers, stoves etc.), TV's and computer screens, small electronic appliances (mobile phones, irons, lighting equipment etc.), corona discharge bulbs, and smoke detectors. • Reports total annual Collection Rate for all electronic equipment (111,356 tonnes in 2015) [3], and collected volume per inhabitant (approx. 10 kg/Belgian in 2015)[3]. This is supported with metrics regarding consumer awareness campaign success and consumer survey results.

Existing EPR Schemes

- Batteries
- WEEE
- Household packaging
- ELV
- Tires
- Graphic paper
- Used oils
- Pharmaceuticals
- Agricultural firm
- Disposable plastic kitchenware
- Photo-chemicals

1. Deloitte France, Oil EPR Case Study Belgium, 2012
2. Bebat, Figures 2015
3. Recupel, Annual Report 2015

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EPR programs in other jurisdictions

Spain

Population	47M
# of Programs	8

EPR Scheme	Observations
Pharmaceuticals	• Sigre is the main pharmaceutical EPR scheme in Spain. The program works with laboratories, pharmacies and pharmaceutical distribution companies. • Reports grams per capita collected annually, as well as the number of associated pharmacy drop off locations, and percentage of overall program collection reduction (year over year).[1] • In 2012, Sigre submitted a plan to the Spanish environmental agency to develop the Company Prevention Plan (CPP) program designed to meet regulatory requirements for all pharmaceutical packaging placed on the market. Sigre is the body responsible for the monitoring of the CPP addressing packaging and eco-design in pharmaceuticals (number of labs, estimate of number of packages affected, percentage of global reduction).[1] • Annual audits conducted by third-party auditors to verify compliance with the requirements for collection activities, storage and transportation of product.
Used Oil	• Two main used industrial oil EPR schemes (Sigaus – 90% of members who produce industrial oil on the market[2] and Sigpi). • Sigaus reports on total quantity (of member product) put on the market, Collection Rate and Recycling Rate. [2] • Also the steward reports environmental benefits including estimated CO2 emissions saved due to the regeneration of waste oil (tonnes), total tonnes of oil reused and recovered annually, and GWh of energy generated from waste oil. • 100% of collection costs are covered by EPR schemes.[3] • Sigaus established a four year plan that undertakes oil use prevention actions. Plan metrics are reported annually. Over 1,300 actions have been taken to reduce consumer use such as education to prolong useful life of oils, improving oil compositions to facilitate management of used oils, incorporating regenerated base oils into new oils, and measuring the hazardous nature of used oils to help with improving environmental standards.[3]

Existing EPR Schemes

- Batteries
- WEEE
- Household packaging
- ELV
- Tires
- Oils
- Pharmaceutical waste
- Agricultural firm

1. Sigre, Figures 2013
2. Sigaus, Performance Indicators 2015
3. Deloitte France, Oil EPR Case Study Spain, 2012

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EPR programs in other jurisdictions
Australia

Population	23M
# of Programs	9

EPR Scheme	Observations
Cell Phones	• MobileMuster is the official product stewardship program in Australia for mobile phone recycling. It is managed by the Australian Mobile Telecommunications Association on behalf of industry manufacturers, network carries and service providers. • Recovery Rate conversion from number of units shipped to tonnes using an average value based on advice from manufacturers regarding shipment number and average weights (193.5g in 2015)[1]. The value changes as cell phone designs change. • Diversion Rate calculated from: Total weight of mobile phones components sent to third party recycling or manufacturers (kg)/Annual collections (kg).[1] • Net imports and exports estimated from distributers based on units and converted into tonnes. • Annual Collection Rate (of available phones) calculated from: Annual collection (tonnes) / Discarded Phones (tonnes) x 100.[1] (based on IPSOS market research and assumptions of customer behaviour) • Student Educational programs designed to teach students about the life-cycle of cell phones, from mobile phone design through to the circular economy. The program provides teachers with 20 different learning modules for preschool, primary and secondary teachers that aligns with the national curriculum. [1]
WEEE	• The National Television and Computer Recycling Scheme of Australia is regulated and operated by the Australian Government with 5 co-regulatory programs responsible for all WEEE collection.[2] • The 5 EPR programs are required to meet annual recycling targets in proportion to their member import liability, achieve material Recovery Rate of at least 90% from recycled products, and demonstrate effective program governance and management. Each program reports annual performance metrics and targets as requested by the government. [2] • Annual performance data is collected and reported by the Australian Government for overall analysis of annual WEEE waste management in Australia.

Existing EPR Schemes

- Batteries
- WEEE
- Household packaging
- Photovoltaic systems
- Plastic oil containers
- Cell phones (voluntary)
- Lights and lighting equipment (voluntary)
- Paint and paint packaging (voluntary)
- Tires

1. MobileMuster, Annual Report 2015-2016
2. Government of Australia, National Television and Computer Recycling Scheme Outcomes 2014-2015

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EPR programs in BC

Summary observations and recommendations

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BC's Product Stewardship program provides oversight for 22 programs, managing 14 different product categories

Product Stewardship

British Columbia's Product Stewardship/Extended Producer Responsibility program covers a diverse range of products including beverage containers, electronics, lead-acid batteries, packaging and printed paper, pharmaceuticals, tires, used oil & antifreeze, paints, solvents, pesticides & gasoline (see Appendix A for listing of programs in BC).

Extended Producer Responsibility

In BC, under the principles of extended producer responsibility, it is the duty of the companies producing and importing goods into the province to fund and manage the recycling of their products. In order to accomplish this in an efficient and cost-effective manner, they typically do this through designated single producer or stewardship agencies, under a performance-based program. The BC Ministry of Environment oversees the regulation of such products under the *Environment Management Act* (2004) Recycling Regulation.

Performance-based System

In order to ensure that these programs are operating effectively and in the interests of all British Columbians, the Recycling Regulation includes requirements for annual reporting of program performance. In particular, stewardship plans are required to demonstrate that the plan will achieve, or is capable of achieving within a reasonable time:

(i) a 75% Recovery Rate or another Recovery Rate[1] established by the director,

(ii) any performance requirements or targets established by the director, and

(iii) any performance requirements or targets in the plan

1. Recovery Rate is defined as the amount of product collected in the year divided by the amount sold in the year.

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Recovery Rate

Recovery Rate as an Effective Measure of Program Performance

A recent report by the BC Office of the Auditor General notes that "for well-known categories of recyclable products, such as beverage containers, stewardship agencies have self-reported that they are meeting or exceeding target Recovery Rates." To support this statement they cite the 2014/2015 Recovery Rate targets and performance of Multi-Material BC, Encorp Pacific, and Brewers Distributor Limited. These programs manage the recycling of packing and printed paper, beverage containers.

As these materials are typically collected within the same year as their sale, and have established recycling processes, the performance of the programs that manage them is represented well by Recovery Rate (product collected / product sold).

Challenges applying Recovery Rate to Diverse Products

However, for products whose expected lifespan exceeds one year, such as tires or appliances, or for products intended to be consumed, such as pharmaceuticals or paint, Recovery Rate is not necessarily the best measure of program performance.

Nevertheless, Recovery Rate does provide insight into the overall functioning of these programs. While Recovery Rate targets may not lead to better performance, the measure itself, as well as the context regarding how it applies to a given product is useful to understand the functioning of the various programs. The value is in understanding (and reporting) what external factors, trends and changes affect a given program's Recovery Rate, and in augmenting this metric with other program-specific metrics where appropriate.

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Long-Life Products

Challenges with Recovery Rate

- For products expected to be recovered years after their initial sale, many stewardship programs commented that their annual recovery could not be compared to annual sales. Particularly in a growing economy and expanding population, annual collection would be expected to be smaller than the current year sales. Recovery Rate comparisons made year over year can reflect changes in the economy and population, and not the performance of the program itself.
- Many programs report their annual sales in units and report their annual collection in mass (kilograms) making the comparison more challenging particularly where programs manage a wide variety of products with different masses and compositions.
- The composition of many Long-Life products is changing over time. These changes impact product life expectancy, lengthening and shortening their time on the market, or changing product size and weight, altering collection measurements. For example, oil filters now use more plastic and less metal making them lighter, and many electronics tend to become smaller and lighter over time with each product generation.
- In programs with only one producer, or with very few producers, programs noted concerns regarding disclosure of data that could be viewed as competitive (as it would reveal market share statistics)

Solutions noted

- Numerous programs/jurisdictions conduct studies to establish comparability between sales and collection.
- Data clearinghouses can be used to consolidate program data and/or establish performance measures without releasing sales data.

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Consumables

Challenges with Consumables

- By definition, Consumables are intended to be completely consumed by the user. In an ideal world, products such as paints and medicines would be completely utilized by consumers and patients. However, for many reasons (e.g., patients get well and do not need to continue taking medication), this is not the case, resulting in the need for EPR programs to address these products. Similar to Long-Life products, many Consumables report sales in units and collection in mass (kilograms) making effective EPR performance monitoring a challenge.

Solutions noted

- Some programs and jurisdictions have performed comparability studies in order to estimate the mass of product on the market. (e.g. in France studies were conducted to establish household inventories of pharmaceuticals to compare to mass of product collected)
- Further, some jurisdictions are able to establish household inventories of product available for collection through specific consumer outreach programs. This estimate can support a Capture Rate, defined by product collected / product available for collection.

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Observations of Short-Life products that inform common performance measurement considerations

Product type/Pod	Observations	Considerations
Short-Life Products Examples include: - Beverage Containers - Packaging and Printed Paper - Oil and Oil Filters	• Recovery Rate can effectively communicate program performance • High-volume programs however can demonstrate a "good" Recovery Rate without addressing gaps in collection within BC • Product flow between jurisdictions (i.e. where product is sold in one jurisdiction and recovered in another) can skew reporting of Recovery Rate by Regional District. • Challenges remain even in well-functioning programs with specific industries or municipalities • Some Short-Life Product programs overlap and experience co-mingling of product in their respective streams • Some Short-Life Product programs experience challenges establishing end-fate under their non-financial audit where product is re-used.	• Retain Recovery Rate targets as an effective measure • Support Recovery Rate with Diversion Rate where possible • Consider the use of a risk-based Accessibility Framework to target high-priority accessibility gaps • Support with Province-wide accessibility metrics and consumer awareness surveys • Identify program risk areas by demographic, geography, etc. and target interventions accordingly • Modelling of interregional flow of product would enable better estimates and the identification of areas at risk. • Consider industry-specific outreach and incentive programs (some programs have demonstrated success with this approach) • More frequent and geographically diverse (i.e. rural as well as urban) waste audits will build a stronger dataset against which to compare program performance (e.g. Diversion Rate) and could also support early detection of program issues • Data consolidation across programs with overlap (such as using a clearinghouse model) would enable better performance reporting as well as economies of scale • Developing specific audit criteria and potentially even enabling limited (review-level) assurance of reuse metrics where third-parties provide this service could reduce assurance difficulties

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Observations of Long-Life products that inform common performance measurement considerations

Product type/Pod	Observations	Considerations
Long-Life Products Examples include: - Electronics - Electrical outdoor power equipment - Small and Major Appliances - Lamps & Lighting - Cell Phones - Batteries - Smoke and Carbon Monoxide Alarms - Thermostats - Tires - Vending machines - Large medical equipment - Antifreeze	• Some long-life products are small, and therefore more easily disposed of in household trash (potentially increasing the risk of not being recovered) • Recovery Rate and Absolute Collection are meaningful, however will be influenced by many factors outside the program • The above could be augmented by identifying program-specific risks and identifying which metrics affect them (e.g. the program drivers) • Many Long-Life Product programs measure sales in units and Recovery in mass (e.g. kilograms/tonnes) • Some Long-Life Product programs are dependent upon market conditions for collection • Some Long-Life Product programs experience challenges establishing end-fate under their non-financial audit where product is re-used • Some Long-Life Products have a relatively predictable lifecycle while others are highly variable	• Retain Recovery Rate/Absolute Collection metrics as representative measures of performance • Consider Product Available studies to establish Capture Rate where possible • Estimate, set and track Capture Rate targets • Support with Diversion Rate and measures of product in municipal or other program waste streams • Determine drivers of program performance (e.g. consumer or industry awareness, accessibility measures to ensure province-wide coverage). • As seen in other jurisdictions, programs can conduct studies to establish weight:unit ratios across product classes. This would be an approximation, but can still be useful for performance tracking • Programs dependent upon market conditions should consider accounting for commodity price fluctuations by preparing financial reserves in order to address any potential drop in commodity value • For Long-Life Product programs that are able to demonstrate end-fate management (i.e. through downstream processor certifications) consider using a risk-based assurance framework to allow limited (review) level assurance over performance measures • Where product lifecycle is relatively predictable, Recovery Rate rolling averages (e.g. a 5 year average) could be a more efficient performance monitoring approach

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Observations of Consumable products that inform common performance measurement considerations

Product type/Pod	Observations	Considerations
Consumables Examples include: - Pharmaceuticals - Paint and Household Hazardous Waste	• Recovery Rate and Absolute Collection are meaningful, however will be influenced by many factors outside the program • Consumables performance reporting is particularly sensitive to consumer behaviour • The above could be augmented by identifying program-specific risks and identify what metrics affect them (e.g. the program drivers).	• Retain Recovery Rate/Absolute Collection metrics as representative measures of program performance • Conduct inventory studies (e.g. France's studies of "household deposits" of pharmaceuticals) to establish a standardized Capture Rate where possible • Estimate, set and track Capture Rate targets • Support Capture Rate with Diversion Rate • Determine program risks and drivers of program performance (e.g. consumer or industry awareness, accessibility measures to ensure province-wide coverage) and align performance metrics and targets to key drivers and risks

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Steps to developing a performance measures framework (1/3)
Step 1: Establish a baseline of program risks and performance

Provide the context within which the program operates.

- *Document the manner in which the product is marketed, sold and used - consumers, contractors, industry, or leased, privately used, etc.*
- *Identify the risks the program serves to address.*

1. Conduct year-zero study to determine for the baseline year:

a) The amount of product collected

b) The amount of product sold

c) Product Unaccounted For Study / Consumed In Use Study

d) Landfill audits, wastewater studies, etc.

e) Household/business depositories (e.g. similar to studies regarding medications in France or cell phones in the EU)

2. Within stewardship plans, have programs self-identify top program risks, such as:

- Areas or communities within the province that are underserved
- Demographic awareness/behaviour risks
- Changing product compositions (e.g. novel or challenging materials to process or dispose of safely)
- Impacts of grey-market activities on product lifecycle
- Export leakage of products that is not properly accounted for
- Unidentified product pathways (leading to inaccurate performance reporting)

3. Map specific performance measures that address program risks (e.g. sub-regional accessibility studies, targeted awareness/behavioural modification campaigns, tracking municipal waste stream indicators)

- Include both Collection metrics and targets (e.g. Recovery Rate, Absolute Collection, Capture Rate) and Recycling/Processing/End-Fate metrics and targets where identified as relevant through the program risk assessment (i.e. does collection neutralize a product's environmental risk or are there potential environmental risks that require management through subsequent processing?)

Steps to developing a performance measures framework (2/3)
Step 2: Understand the data

Describe the links between the data being reported and the specific program challenges and opportunities.

1. Document why Absolute Collection, annual market output, and Recovery Rate may or may not be meaningful measures
2. Understand why there are differences across regions, demographics, products.
   a) Why might different product use patterns occur across the province?
   b) Why might consumer behaviour vary across the province?
3. Determine the drivers of reported performance
   a) Accessibility (e.g. does recovery correlate with #/density of collection points?)
   b) Awareness (e.g. survey targeting specific regions and demographics including consumer satisfaction questions, and product collection marketing)
   c) Consumer behavior (e.g. are consumers less likely to recycle smaller products because they can be disposed of in household trash? Could this make these products inherently higher risk? Do awareness survey results correspond to recycling measures? How can awareness programs be improved?)
   d) Product use (e.g. who is using the products (i.e. consumers, industry etc.) and how much product is available for collection?)
   e) Product lifecycle or composition changes
   f) Method of collection (e.g. reverse logistics) as different methods have different benefits and risks
   g) Potential impacts of waste prevention or related initiatives (e.g. trends in prescription drugs, eco-design, etc.)
   h) Any interactions with other product programs where the potential exists for overlap and gaps (e.g., products being broken down and flowing through separate programs)
   i) Any additional metrics tied to the risks identified in Step 1.

Steps to developing a performance measures framework (3/3)
Step 3: Set targets

Set targets that lend themselves to continuous improvement goals.

1. Set targets related to risk drivers and estimate impacts on program performance (e.g. an increase of 20% in consumer awareness in a target demographic is expected to result in a 15% increase in recovery)
2. Develop waste prevention targets (e.g. create financial incentives for producers to design products with less waste, less packaging, or that are more straightforward to decompose/recycle)
3. Monitor trends in other program/collection streams (as identified in step 1.3)
4. Customize assurance criteria to address program performance measures

Summary of Overall Observations and Recommendations (1/2)

Observations	Recommendation
• Programs use an inconsistent set of terms and definitions for performance measures (e.g. "Collection rate" for Capture Rate) leading to a lack of clarity in program reporting. • Opaque calculations for some performance measures.	• Utilize standardized terminology and calculation methodologies following CSA Guideline (where appropriate) for accountable management of end-of-life materials[1] • Where programs calculate an alternative to Recovery Rate, ensure they utilize an accepted, standardized calculation methodology such as *consumption and use method, saturation model, market supply method, discard model*, and *waste auditing*.[2]
• A mandated minimum 75% Recovery Rate target does not make sense for all programs • Meaningful performance measures are unique to products and location. • Many programs fail to demonstrate what factors drive program performance (e.g. is it consumer or industry awareness? accessibility? Other factors?)	• Retain Recovery Rate as a measure and where relevant retain Recovery Rate targets • For Consumables and Long-Life Products, set targets according to defensible recovery alternatives and where relevant, program performance drivers • Introduce a standardized Product Unaccounted-For framework. • Work with municipalities and stewards to enhance the scope and frequency of landfill audits to obtain a greater sample size to support development of Diversion Rate measures for Long-Life Products (e.g., improve ability to calculate based on statistically significant samples)

1. A Guideline for accountable management of end-of-life materials, CSA Group 2015
2. Data Requirements for Monitoring Effectiveness and Efficiency of Waste Diversion Programs in Ontario: Program Targets and Reporting, Waste Diversion Ontario, 2010

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Summary of Overall Observations and Recommendations (2/2)

Observations	Recommendation
• Many programs currently report units sold and mass (kilograms) collected creating a disconnect.	• Many product programs in other jurisdictions have addressed this challenge with comparability studies, acknowledging that there is a degree of uncertainty in this estimate but focusing on best practices in reporting and continual improvement.
• Inconsistent scope and rigour in third-party non-financial audits reduces credibility of program performance self-reporting.	• Utilize the stewardship plan and amendment process to develop and define appropriate program-specific performance metrics to be reported that are subject to third-party non-financial audit. • Consider adopting a risk-based assurance framework with a set of standardized assurance procedures for high-risk or non-compliant programs.
• Competing programs both within and across product types create barriers to effective performance measurement.	• Evaluate potential to facilitate consolidation of data at a provincial level in order to roll up consistent performance metrics in stewardship plans and address inter-program challenges.
• Many programs fail to identify costs/tonne or unit.	• Jurisdictional scans indicate many programs/jurisdictions reporting on program costs per unit/tonne and by population. This data would provide transparency and financial performance information to producers and consumers, noting that: ○ The lowest cost program is not necessarily the best. ○ Comparisons between different product streams is challenging, as the quantities, types of waste, and therefore the organization of operations, are not comparable. ○ Costs and performance are influenced by many factors, including factors external to the design and implementation of the EPR scheme, such as: ○ Population density and economic geography ○ Historical development of the waste management infrastructure ○ Value of secondary materials in the commercial marketplace ○ Awareness and willingness of citizens to participate[1]

1. Deloitte France, Development of Guidance on Extended Producer Responsibility, European Commission – Final Report, 2014

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Conclusion

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EPR Programs in British Columbia
Building upon a strong foundation

- BC's Product Stewardship framework has been recognized as one of the leading programs of its kind in Canada[1]
- Building upon recent enhancements to the assurance program, the province is taking the opportunity to further enhance the program by improving the approach to defining relevant and meaningful performance targets for EPR programs
- A key step in the evolution of the program is to align performance metrics with the unique lifecycles, risks and uses of the many products covered under EPR legislation in the province
- This document describes an approach that highlights strengths in existing performance metrics, as well as opportunities to improve performance measurement for three categories of products (short-life products, long-life products and consumables)
- These recommendations are intended to align performance metrics to the risks and drivers that are specific to each program category, in order to support effective monitoring, oversight and continual improvement

1 - http://www.eprcanada.ca/reports/2014/2014-Extended-Producer-Responsibility-Report-Card-EN.pdf

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Appendix A

EPR Programs in British Columbia

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EPR Programs in British Columbia

Program	Types of Products
Health Products Stewardship Association	• Unused or expired prescription and over-the-counter medications • Unused or expired health products (creams, vitamins, minerals, herbal products, etc.)
Product Care Association	• Paint • Pesticides • Flammable liquids • Household hazardous waste (e.g., lightbulbs)
Encorp Pacific	• Beverage containers
Brewers Recycling Container Collection Council	• Beverage containers • Packaging
Multi-Material BC	• Packaging and Printed Paper
BC Used Oil Management Association-	• Used oil, oil filters and oil containers • Antifreeze and antifreeze containers
Electronic Product Recycling Association	• Wide range of electronic products (e.g. computers, monitors, toys, cell phones)
Outdoor Power Equipment Institute of Canada	• Electric outdoor power equipment (handheld, walk-behind and free-standing equipment, as well as tractors)
Canadian Electrical Stewardship Association	• Wide range of electronic or electrical products including small appliances (e.g. kitchen, bathroom, fitness, etc.)
Major Appliance Recycling Roundtable	• Major household appliances (e.g., refrigerators, freezers, air conditioners, dishwashers, etc.)
Light Recycle	• Lightbulbs (numerous varieties) • Lighting fixtures (ceiling fixtures, bike lights, floor lamps, etc.)

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EPR Programs in British Columbia

Program	Types of Products
TELUS	• Electronics sold and/or used by Telus
RecycleMyCell	• Cell phones
Shaw	• Electronics sold and/or used by Shaw (e.g., modems, routers, set-top boxes, personal video recorders, remotes, satellite receivers, batteries, and phones)
Call2Recycle	• Batteries, other than lead-acid
Canadian Battery Association	• Lead-acid batteries
AlarmRecycle	• Residential smoke and carbon monoxide alarms (including combined alarms)
Heating, Refrigeration and Air Conditioning Institute	• Thermostats
Tire Stewardship BC	• Used tires
GE Healthcare	• Radiology, diagnostic imaging, hospital and medical equipment that exceeds 200 kg by weight
Canadian Beverage Association	• Beverage coolers, vending machines and dispensing systems

* Please note, in addition to the above program-specific products, all programs are also responsible for product accessories such as those associated with cell phones and electronic devices.

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