

RESEARCH AND RECOMMENDATIONS FOR

PERFORMANCE MEASURES

For Regulated, Industry-led, End-of-life
Electronics Recycling Programs In Canada

Commissioned By:



Atlantic Canada Electronics Stewardship (ACES)



Electronics Stewardship Association of British Columbia (ESABC)



Ontario Electronic Stewardship (OES)



Saskatchewan Waste Electronic Equipment Program (SWEEP)



Background and Objectives

- ACES, ESABC, OES and SWEEP have each developed stewardship plans which form the commitment of the program to deliver services in compliance with the provisions of the plans and regulation.
- Each plan includes provisions for ***performance reporting***.
- While plans and regulations are different in each jurisdiction, the programs recognize there are advantages to a coordinated and harmonized approach.



Background and Objectives (II)

Objective of this study – to analyze and make recommendations for a core suite of performance indicators for the programs to adopt.

Primary purpose of the core indicators:

- To allow each program to track its own performance over time;
- To facilitate comparisons and benchmarking between jurisdictions;
- To communicate performance accomplishments and targets to government and other stakeholders.



Background and Objectives (III)

Study Advisory Committee

- Executive Directors for ACES; ESABC; OES and SWEEP
- Resource Recovery Fund Board (RRFB)
- Encorp Pacific
- StewardEdge
- Product Care Association
- SARCAN Recycling
- Harmonization staff
- InterGroup Consultants



Performance Measures Guiding Principles

In order to develop a preferred set of core indicators, it is necessary to have a series of guiding principles to evaluate different options.

#1. Representative of Performance – It should convey something meaningful about the program's performance. It should be responsive to change and within the program's capacity to influence over time. It should also be reflective of the key policy reasons for implementing the programs.



Performance Measures Guiding Principles

#2. Easily communicated to and understood by stakeholders – The indicator should be intuitive to understand and easily communicated to stakeholders.



Performance Measures Guiding Principles

#3. Data accessibility and reliability – The indicator should be based on data that is feasible for the program to collect, maintain and report with accuracy. Where estimates are used they should be clearly stated. Ideally data could be independently surveyed and verified by a third party. Estimates produced through modelling techniques cannot be independently reviewed and verified and therefore should not be used.



Performance Measures Guiding Principles

#4. Cost effectiveness – The indicator should be cost effective to collect and report.

#5. Comparability across programs – The indicator should facilitate comparisons across programs and with other jurisdictions.



NOTE: *It is understood that not all performance indicators will satisfy all the guiding principles equally. The principles were used to develop a suite of core indicators that each of the four programs can implement. It is recognized that each program may have additional specific performance measures required by their regulators.*



Case Study Program Criteria

- **Geographic location** – selection of programs within Canada, USA and Europe.
- **Program duration** – those operating for a longer period of time assumed to have better established data collection methods and reporting mechanisms.
- **Reputation** – leading edge electronics recycling programs as per an assessment of relevant literature and communications with key industry personnel.

A total of 13 program case studies were completed. Data collection was also undertaken regarding the WEEE Directive. The research team discovered that across these programs performance indicators fall into one of 5 groups of indicators.



International Case Studies

PROGRAMS / JURISDICTIONS EXAMINED:

CANADA	UNITED STATES	EUROPE
ACES (Nova Scotia)	California	El Kretsen (Sweden)
ESABC (British Columbia)	Maine	Recupel (Belgium)
OES (Ontario)	Minnesota	SWICO (Switzerland)
SWEEP (Saskatchewan)	Oregon	WEEE Directive
ARMA (Alberta)	Washington	



Case Study Findings

Indicators

- **Financial indicators** – reflect program performance in financial terms, including costs associated with transportation, collection, processing and communication.
- **Operational indicators** – seek to characterize program performance based on recycling and collection volumes or rates (and other related processes).



Case Study Findings

Indicators

- **Awareness indicators** – measures, often obtained through public surveys to characterize program success in terms of public awareness and engagement.
- **Accessibility indicators** – to describe the ease or convenience associated with collection and recycling.



Case Study Findings

Indicators

- **Environmental Impact Measures** – to characterize or measure actions undertaken to reduce the environmental impacts of electronic products including design for environment, mass balance, recycling efficiency and others.



Recommended Performance Indicators

<p style="text-align: center;">Operational Indicators</p> <ul style="list-style-type: none"> ✓ Total WEEE Collected (tonnes) ✓ Total WEEE collected per capita (tonnes) 	<p style="text-align: center;">Financial Indicators</p> <ul style="list-style-type: none"> ✓ Total program costs per tonne ✓ Operational costs per tonne ✓ Overhead costs per tonne
<p style="text-align: center;">Accessibility Indicators</p> <ul style="list-style-type: none"> ✓ Per cent of population covered by collection sites ✓ Total collection sites ✓ Total collection events 	<p style="text-align: center;">Environmental Impact Indicators</p> <ul style="list-style-type: none"> ❖ <i>Total weight of material recycled as percentage of material collected (by weight)</i> ❖ <i>Greenhouse gas emissions</i> ❖ <i>Mass balancing</i> ❖ <i>Trends in processing</i>
<p style="text-align: center;">Awareness Indicators</p> <ul style="list-style-type: none"> ✓ Percentage of population aware of the program 	

✓ = Immediate Collection & Reporting
 ❖ = Future / In Development



Summary of Recommended Performance Measures (I)

Indicator	Recommendation	Implementation
Operational Indicators		
Total WEEE collected (tonnes)	Include in initial suite of core indicators	Immediate
Total WEEE collected per capita	Include in initial suite of core indicators	Immediate
Financial Indicators		
Total program costs per tonne	Include in initial suite of core indicators	Immediate
Operational costs (collection, consolidation, transportation and processing) per tonne	Include in initial suite of indicators	Immediate
Overhead costs (administration, communication, outreach, etc.) per tonne)	Include in initial suite of core indicators	Immediate



Summary of Recommended Performance Measures (II)

Indicator	Recommendation	Implementation
Accessibility Indicators		
Per cent of population covered by collection sites	Include in initial suite of core indicators	Immediate
Total collection sites	Include in initial suite of core indicators	Immediate
Total collection events	Include in initial suite of core indicators	Immediate
Awareness Indicators		
Percentage of population aware of the program	Include in initial suite of core indicators	Immediate



Summary of Recommended Performance Measures (III)

Indicator	Recommendation	Implementation
Environmental Impact Indicators		
Total weight of material recycled as percentage of material collected by weight	Undertake further research and investigation on methods for data collection and reporting in the near term.	Near term (by 2012)
Greenhouse gas emissions	Undertake further research and investigation on methods for data collection and reporting in the future.	Future (beyond 2012)
Mass balancing	Undertake further research and investigation on methods for data collection and reporting in the future.	Within 12 months of initial implementation of core performance measures – 2011
Trends in processing	Include information on trends in processing end-of-life electronics in suite of core indicators	Within 12 months of initial implementation of core performance measures – 2011



Capture Rates & Electronics (I)

- Capture rates are utilized in a wide variety of recycling programs, and may be characterized as collection rates, recycling rates, recycling efficiency rates, market shares or recovery rates.
- While the concept of a capture rate is attractive, our research shows extending the method to recycling programs that manage durable products such as electronic products raises serious analytical problems.
- Electronics products are durable goods that have much longer and more variable life-cycles than non-durable products such as beverage containers.



Capture Rates (II)

- In order to develop an estimate for the “material available for collection” (the denominator in the capture rate calculation), one of two approaches is generally used:
 1. In some cases, the calculation uses an estimate based on the actual number of products sold in a particular period compared to the number of units collected.
 2. In other cases the calculation uses an estimate based on a model that attempts to predict the amount of material available to be collected based on product.



Capture Rates (III)

- Each of these approaches has serious analytical limitations. For either of these measures, the estimate of units collected does not correlate to the sales data as programs do not have a monopoly on collection and can provide estimates only of the units they collect.
- Regardless of the sales data source, a capture rate based on any estimate of units sold in a particular period does not accurately represent the amount of material available to be collected, due to the long and variable service lives of electronics products.



Capture Rates (IV)

- With respect to capture rates based on estimates prepared using a model, the following is noted:
 - These models attempt to predict the amount of material available to be collected based on product weights, life cycle estimates and sales information.
 - Where these models have been developed, they are extremely data intensive to produce, expensive to develop and maintain and impossible to independently test and verify.



Capture Rates (V)

- As a result of these limitations, neither approach provides a credible estimate of the material available to be collected in a given period that can be reliably measured and independently confirmed or verified.
- Given these limitations, a capture rate is not a meaningful performance measure for durable goods such as electronics products



More Info?

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