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ASTSWMO

Solid Waste Management Officials

Product Stewardship Program Evaluation Tool

A guide for measuring and evaluating product stewardship programs

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Prepared by the

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Materials Management Subcommittee

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NOTE

The Product Stewardship Program Evaluation Tool was prepared by the Product Stewardship Task Force within the Materials Management Subcommittee of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). The Task Force has recently sunsetted, and product stewardship issues are being addressed by another Task Force within the Materials Management Subcommittee. ASTSWMO thanks the Product Stewardship Task Force for their work to develop this document and for all of their prior work.

Introduction

The Product Stewardship Program Evaluation Tool provides guidance on how to measure and evaluate product stewardship or extended producer responsibility (EPR) programs, recognizing that each State and Territory (State), law, and product-type is unique.

During the past decade individual States have started implementing product stewardship programs for a range of products. These programs are expected to grow in number as they offer a means to sustainably finance recycling programs, while supporting source reduction, reuse, recycling and composting activities.

This tool was developed as a follow-up piece to the *ASTSWMO Product Stewardship Framework Policy* document, which is described in a subsequent section. As noted in the policy document, under a framework approach, States can define the product stewardship program structure, set criteria for selecting products and then add products to the stewardship program either by regulation or legislative authorization. Therefore, the State programs that are the focus of this guidance are those that have been created by regulation and/or legislation, and as such include data requirements. Voluntary State product stewardship programs are outside of the scope of the tool, though those programs may be able to use some of the concepts.

An important aspect of good program management is to measure progress and continually improve programs over time. To make this feasible, it is essential to measure progress, meaning, there needs to be measurement methodology supported by clear and attainable metrics for each program. Furthermore, if one State uses the same methods and metrics as another, it can facilitate comparisons and help everyone better decipher what works well. This can assist programs so they make continual improvements in the years ahead.

As product stewardship programs in the U.S. are maturing, the emphasis on evaluation methodologies and identification of best practices by others is expanding as well. This is apparent in both European Union and Canadian[1] EPR programs.

When measurement methodology and metrics are known from the initial startup, it is vastly easier to implement them. For this reason, readers are encouraged to refer to this document at different phases in the program development process, particularly in the early stages.

The tool was developed for State programs, though others may find it useful.

How to Use the "Tool"

In bringing out some key questions and considerations regarding program metrics, this document is intended to be an informational tool States can use throughout the program evaluation process, beginning with program development. It has not been structured as a data tool in which metrics can be entered.

During program development, there are several phases where this document can provide assistance.

[1] http://www.eprcanada.ca/

a. Legislative phase. Legislation defines the program purpose. Ideally legislation also specifies what is to be measured and who is responsible for this activity. In particular, it is important to specify roles and responsibilities so that entities that have data, or can easily obtain the data, are assigned the role of providing the data for program measurement. For States developing regulations to support the statute, details on measurement may be defined during the regulation development phase; otherwise, describing them in statute can help ensure meaningful measurement occurs.
b. Plan development phase. Often, product stewardship programs are implemented by a stewardship organization. The stewardship organization prepares a plan that is approved by the State. Sometimes an entity submitting a plan (producer or stewardship organization) is required to describe a methodology for measuring program success.
c. Program implementation. By this phase, the methodology and metrics should be defined, and there should be continual reference to whatever documents exist to ensure data are collected and progress tracked. This might mean checking forms used to collect data, developing accounting systems, and other resources. It also may mean further refining definitions that are used to describe the metrics or tweaking data collection points consistent with program requirements.
d. Program evaluation and reporting. For an already established program, it may be helpful to refer to this tool to identify additional metrics to consider for program measurement. If another State has a similar type program, by using similar metrics, it may be easier to compare and learn from each other.

Definition of Terms

In 2012, a group led by the Product Stewardship Institute, the Product Policy Institute and the California Product Stewardship Council, with input from many States, local governments and other stakeholders, conducted a national dialogue on definitions. This group developed definitions and principles of product stewardship and extended producer responsibly. Both terms are used, often interchangeably, in both policy documents and in statute in the U.S. The definitions are as follows:

> ***Product Stewardship*** *is the act of minimizing health, safety, environmental and social impacts, and maximizing economic benefits of a product and its packaging throughout all lifecycle stages. The producer of the product has the greatest ability to minimize adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Stewardship can be either voluntary or required by law.*
>
> ***Extended Producer Responsibility*** *is a mandatory type of product stewardship that includes, at a minimum, the requirement that the producer's responsibility for their product extends to post-consumer management of that product and its packaging. There are two related features of EPR policy: (1) shifting financial and management responsibility, with government oversight, upstream to the producer and away from the public sector; and (2) providing incentives to producers to incorporate environmental considerations into the design of their products and packaging.*

These definitions are complementary to the definition that appears in the *ASTSWMO Product Stewardship Framework Policy Document*, described below, and are included here as the most current reference of definitions.

The ASTSWMO Product Stewardship Task Force (Task Force) notes that many programs fall on a spectrum between the two definitions, having characteristics that fit both definitions (e.g., increased producer responsibility implemented through legislation, but not complete producer financial responsibility). For simplicity, the Task Force is using the more general term "product stewardship" in this document.

Throughout this document the Task Force is using the term "producer" to refer to the product manufacturer or producer. Product stewardship programs generally define the "producer" to include the product manufacturer (sometimes called the original equipment manufacturer or OEM) or brand owner, and if they are not located in the State, then the first importer or retailer is the producer.

ASTSWMO Product Stewardship Framework Policy

Recognizing the increasing prominence of product stewardship as an environmental policy tool, in 2008 the ASTSWMO Product Stewardship Task Force developed the *ASTSWMO Product Stewardship Framework Policy Document* (*Policy Document*)[2] to identify many of the key issues associated with the development of product stewardship policies at the State level. The analysis and development of policy options were informed by individual States' consideration of individual products as well as comprehensive product stewardship policies.

The ASTSWMO Board of Directors adopted the *Policy Document* on October 28, 2009. Briefly, it provides guidance to States as they grapple with reducing the environmental impact of products. It explains product stewardship and discusses key considerations in developing programs, such as: financing, performance goals, role of State/local government, individual vs. collective responsibility. Also, it offers recommendations and includes several case studies.

This evaluation tool expands on the question of performance goals, which depend on meaningful measurement of program performance.

Evaluation Tool Purpose

This evaluation tool is designed to facilitate greater consistency among product stewardship programs being implemented by States through the use of common measurement methods and metrics, which in turn will make it easier to decipher what works well across programs and advance continual improvement of these programs.

While recognizing that different programs will have different program metrics, this document examines parameters such as:

- Costs (e.g., total program costs; costs related to compliance; costs to local government) and revenues;
- Environmental impacts (e.g., rates of collection; reuse, recycling, energy recovery and disposal; greenhouse gas emissions);

[2] http://astswmo.org/Files/Resources/Sustainability/ASTSWMO_Product_Stewardship_Framework_Policy_Document-Dec2009.pdf

- Program effectiveness (e.g., establish program targets/goals and measure progress against goals); and
- Job creation.

Other resources measuring or evaluating product stewardship programs are listed in Appendix A. Some of those materials were used in the development of the evaluation tool detailed in this paper.

Four case studies are provided in Appendix B of this document that outline program metrics. While programs may not have all the data suggested, especially at the program onset, noting what is available and not available can help foster wider data collection in the future.

This document also provides lessons learned and recommendations from States implementing product stewardship programs.

Principle Questions for Program Evaluation

This section presents broad questions about program performance that can be determined, in part, through the collection and analysis of program metrics (data), which, when measured over time, show trends. Following each numbered question, there is a summary explaining the context of the question. Each numbered question is followed by more specific questions on the same theme. The following section in this document, "Overview of Program Metrics", further expands on this analysis with quantitative data elements.

1) Does the program sufficiently engage producers and brand owners in the financing and management of the program?

The producers of products have the greatest ability to minimize adverse impacts, therefore, they have the greatest responsibility for financing and managing product stewardship programs. Giving producers the responsibility for managing the system allows them the flexibility to develop a system that is economic and efficient.

- Does the authorizing law, or stewardship plan approved by the State, provide sufficient direction to producers and brand owners about their responsibilities?
- Are producers fulfilling their responsibility for managing, operating and funding the program?
- Do local governments incur costs associated with managing products covered by this program?

2) Does the program achieve a high collection rate for products? Does the program achieve its other goals?

Clear goals for the amount of product collected for recovery in a given year are important for defining program success. The collection rate is the amount of material collected for recovery as compared to the amount available for collection. Determining the *amount collected* through the program is generally straightforward, however, determining the *amount available* for collection is often not so easy to determine. For some products that have a short life span (e.g., beverage containers), sales data can be used. For products with a longer lifespan (e.g., thermostats) or products that are used up (e.g., paint), other methods need to be used. If the amount available

for collection cannot be determined, other measures such as convenient collection service, the total amount collected, or use of waste composition studies may be needed to evaluate the effectiveness of the program.

The program targets can encompass collection as well as the actual amount of materials recycled. This and other more specific metrics are discussed in the "Overview of Program Metrics".

- Does the program have goals or targets that are defined in law or the stewardship plan approved by the State?
- If goals or targets are established in regulation or a stewardship plan, what is the performance compared to the goals or targets?
- Is the product effectively removed from the waste stream as determined by waste composition studies?
- If a target for the number of collection facilities is established in the stewardship plan or business plan, has the target been met?
- Has the amount of product collected or the number of collection facilities decreased or increased since program inception?
- Has the need for more collection facilities been identified as an issue?

3) Are the collected products handled, transported and processed in an environmentally sound manner?

Many product stewardship programs are for products that contain toxic substances or are difficult to manage in some way. The materials collected should be handled, transported and processed in compliance with all applicable federal, State and local environmental laws and regulations.

- Does the authorizing law or stewardship plan approved by the State provide sufficient direction?
- Does the stewardship organization provide service providers with information and training in best management practices for environmental protection?
- Does the stewardship organization undertake or require regular audits of service providers to assess compliance with environmental regulations and best management practices?
- Are there known violations to environmental laws and regulations?

4) Does the program support the highest end use of the product, in accordance with the Integrated Solid Waste Management Hierarchy?

An effective and efficient program provides the most practical and beneficial use of the material and energy values of the waste. Although the upper tiers of the hierarchy may not be as applicable or cost effective for some products as for others, it is recommended that all programs seek to follow the hierarchy as defined in applicable laws or to the extent practicable. The graphic illustrates the waste management hierarchy established by the U.S. Environmental Protection Agency (EPA)[3]. The Task Force suggests that the State-specific hierarchy or the EPA hierarchy be used, in order of descending preference, when designing a product stewardship program.

- Does the statute support or prioritize reuse and refurbishment activities?
- Does the stewardship organization present quantified information on the application of the hierarchy, if appropriate, in annual reports?
- Do long term historical trends demonstrate constant or enhanced application of the hierarchy?
- Are local processors utilized, where available?

5) Is there an outreach and education plan and is it being implemented?

In order for a program to be fully utilized and effective, consumers must be aware of it and have easy access to information on how and where to return the product covered under a program. This often requires a partnership between the producers, stewardship organization, retailers and local governments. Some programs may need to target a specific audience (e.g., auto recyclers for mercury switches) and others may need to reach the general public (e.g., household paint).

- Does the authorizing law or stewardship plan approved by the State provide sufficient direction on plan implementation?
- Does the stewardship organization prepare an annual communications/marketing plan/strategy?
- Does the State agency and/or stewardship organization provide/maintain a web site or telephone access?
- Does the program regularly distribute video, audio, brochures and/or other materials via various media (e.g., electronic social/professional networks, radio, TV, print) to key audiences?
- Does the program provide communications support materials to retail outlets?
- Does the program partner with local government in distribution of information to residents?

[3] http://www.epa.gov/osw/nonhaz/municipal/hierarchy.htm The U.S. EPA hierarchy may be somewhat different in each State, but generally a form of this hierarchy is used nationally.

- Does the program regularly evaluate its communications strategy?
- Do surveys indicate awareness of the program and its requirements?

6) Is the program transparent and accountable to government and consumers?

Most programs require an annual report that covers elements defined in the statute, regulation or stewardship plan. Common reporting elements include the collection rate, recycling rate, number of collection sites and, depending on the program, financial information to the State agency. These reports should be available to the public and transparent enough for the State agency to evaluate the effectiveness of the program. Some programs have a fee that is attached to the purchase of a product, which is used to pay for the program. Programs with this type of funding usually have a stewardship organization that is accountable for how the fee is set and how the funds it generates are spent.

- Does the authorizing law or stewardship plan approved by the State provide sufficient direction transparency and accountability?
- Is the stewardship plan publicly and readily available?
- Does the annual report provide program performance and compliance information?
- Does the publicly available financial statement show revenues from recycling fees, expenditures on operations, communications and administration?
- Is there multi-stakeholder involvement in the stewardship organization?
- Was the stewardship organization's IRS Form 990 (filed by non-profit organizations) reviewed?
- Is there is a process in place to evaluate performance and adjust programs to make them more successful?

7. Does the program function in an economically efficient manner that is meeting the overall economic objectives of the program?

A program may allow producer flexibility to design the most economically efficient system to meet the program's performance standards. A few common metrics of interest are program costs per unit of material collected or recycled, job creation and other metrics related to the program objectives.

When it comes time to analyze program results, it is very important to only compare programs that are essentially the same (e.g., cover the same products, services and program objectives).

- Does the authorizing law or stewardship plan approved by the State define economic objectives and provide sufficient direction to track jobs or other economic considerations?
- What are the program costs and how do they compare with similar programs?
- What is the change in jobs resulting from the program?
- What level of investment in facilities and equipment has occurred?
- How has the number of businesses involved in recycling changed?
- Does the program offer any incentives (e.g., grants, subsidies, loans) and what are the impacts of these incentives?

8) What is the State government role authorized through legislation? Does the State have the resources necessary for fulfilling its responsibilities?

Although the producers are responsible for funding and implementing product stewardship programs, State agencies have an oversight role that should be defined and funded for the program to be successful. The State agency can ensure that all the producers are meeting their obligations, ensure that there are no free riders and evaluate the program to ensure it is meeting the needs of consumers.

- Does the authorizing law provide sufficient support so the State agency has the resources needed to carry out its oversight and enforcement responsibilities?
- Does the program provide a level playing field among producers? (e.g., do all producers required to participate in the program participate? Is there a penalty for not participating?)

Overview of Program Metrics

This section presents program metrics that can be used in tracking progress of product stewardship programs. When these data are tracked year to year, they can inform the *Principle Questions for Program Evaluation* covered in the previous section. Among the program metrics are performance indicators, a subset of the most important program metrics. In this section, performance indicators are split into the following groups:

- Key performance indicators – most critical for evaluating product stewardship program progress
- Other performance indicators – additional data that are useful in evaluating program performance
- Additional data – listing of some data reported in the case studies in Appendix B

Although data for all the performance indicators below may not be available, the Task Force recommends that efforts be made to collect sufficient data, with particular attention given to the key performance indicators. Individual programs could select performance indicators from the lists below that best suit the program and product.

Data presented below pertain to a period of time, usually a calendar year (e.g., units or weight collected/capita/year).

<u>Key Performance Indicators:</u>

- Units or weight collected for recovery[4] (expressed as total amount and per capita)
- Units or weight of product available for collection
- Recycling rate (reported as percentage)
    - expressed as units/weight recycled divided by units/weight available for collection

[4] Recovery in this context refers to collection of materials for reuse, recycling, composting or energy recovery, instead of disposal.

- Cost/unit or weight collected for recovery
- Cost/unit or weight recycled (indicate if residuals are included or not)
- Total program costs (collection, sorting, recycling, promotion, administration)

Other Performance Indicators:

- State population (needed to calculate per capita data)
- Recovery rate (reported as percentage)
    - expressed as units/weight collected divided by units/weight available for collection
- Units or weight recycled/capita
- Total units or weight recycled
- Total costs for collection (see Cost Data paragraph below)
- Total costs for recycling (see Cost Data paragraph below)
- Total program funds received
- Access to recycling (convenience)
    - Collection site for cities larger than 10,000 and at least one site in each county
    - Supplemental mail back program for underserved/rural areas
    - Collection events offered in underserved/rural areas
- Percentage of known producers that are participating in the program
    - This percentage should be at or near 100%
    - How many "free rider" producers are there?
    - Include retail branded products when they are included as "producers"
- Tons of greenhouse gas reduced as a result of recycling
    - An important metric if a product stewardship program is part of a larger climate change initiative
    - This requires a conversion factor for calculating reduced emissions from units or weight recycled
    - Evaluate using the EPA WARM model[5]

Additional data:

Stewardship Organization data:

- Producers (how many are participating)
- Producer noncompliance (reflect enforcement)
- Product stewards (how many plans)
- Design improvement of the product (by producers)

Cost data:

- Program cost (Product Stewardship Organization (PSO) reported program cost)
- State government cost (oversight/enforcement)
- Communication cost (outreach and education)
- End-of-life materials management cost (portion of program cost for recycle, reuse, or disposal)
- Administration cost (for the PSO or government)
- Local government cost
- Cost per capita
- Cost per unit collected

[5] http://www.epa.gov/climatechange/waste/calculators/Warm_home.html

Program data:

- Collector participation (vs. collectors without the program)
- Collected product reused
- Collected product landfilled
- Collected product for energy recovery
- Investment in infrastructure (by the PSO)
- Program progress compared to goals or targets (in plan or regulations)
- Product user awareness
- Public awareness (PSO surveys or government surveys)
- State jobs (State staff required for oversight and enforcement)
- Collector/recycler jobs (indicate if direct or indirect)

The lists above provide a menu of program metrics from which to choose those that are most appropriate to a State's situation. Some data may be more accurate than others depending on the robustness and reliability of the data behind the indicator. Some indicators are a more direct measure of progress (e.g., the recycling rate or units/weight recycled/capita) than others (e.g., access to recycling, percentage of producer participation or greenhouse gas reductions). A combination of these tracking elements provides a more accurate progress assessment than a single tracking element. The following subsections provide more discussion of the performance indicators regarding costs data, data qualifications, and overall data.

Cost Data: Cost data are meant to quantify the incremental costs associated with providing collection, sorting, recycling, promotion and administration. "Incremental" operational costs are the costs associated with providing collection or recycling using new or existing collection or recycling infrastructure (buildings, trucks, materials handling equipment). Incremental operational costs for collecting or recycling the product or material typically include staff wages and fringe; facility utilities; fuel; pallets; Gaylord boxes and other supplies. Incremental promotion and administration costs are the costs associated with promoting and administering product stewardship by new or existing organizations. Incremental promotional and administration costs typically include staff wages and fringe benefits, facility utilities, cost of advertising time or media and office supplies. Incremental costs may not include initial or maintenance costs of land, buildings, office equipment and furniture, materials handling equipment or depreciation on land, buildings and equipment.

Data Qualifications: Some performance indicators may not be comparable from State to State. For example, population density may affect the convenience and effectiveness of collection sites. The same distribution of collection sites in a densely populated State with a small geographic area may result in a higher recycling rate than in a more sparsely populated State with a large geographic area. Similarly, the cost elements in "total costs of collection" and "total costs of recycling" may vary from State to State, depending on legislative requirements and guidelines.

Overall Data: The inclusion of the following data in annual product stewardship reports can facilitate calculation and evaluation of performance indicators:

- Accurate costs and revenues detailed as necessary by product/material or category. For example, for electronics recycling programs, it may be useful or necessary to list costs and revenues by product type; for example, break out costs by televisions, monitors, and

laptops. For mattress recycling programs, it may not be useful or necessary to list costs/revenues by type or size of mattress;
- Consistent reporting of costs and revenues into similar categories for all programs;
- Accurate data on sales by product or material detailed as necessary by product/material or category (see the examples in the first bullet, they apply here as well).
- Accurate data on collection by product or material and amount of product or material available for collection (so that reliable recovery and recycling rates can be determined);
- Information on mandated targets or goals (in the plan, law or rules), progress against targets or goals and historical information on past progress and results.

Guidelines on Customizing Program Metrics

Product stewardship program metrics for some products may need to be developed for two or more sub-categories of materials within the products. For paint and used oil product stewardship programs, for example, separate data may need to be collected for the paint/oil itself and separately for the containers, both of which are recycled. Likewise, for paint, packaging, containers and electronics, data may need to be collected separately for latex vs. oil-based paint; plastic vs. paper packaging; glass vs. plastic vs. aluminum vs. steel containers; computers vs. televisions vs. monitors for electronics. Case studies in Appendix B provide examples of product-specific performance indicators.

What to do if data are not available: While some performance indicators are fairly straightforward to collect or derive, there are other data that can be problematic to the point that reliable data are not available. Two examples include:

- Product sales data may be expensive, proprietary or not available on a State-by-State basis. Corporate annual reports or other reports/data sets that are available on the Web may not contain the necessary detail. In may be necessary to allow a few years for producers or the stewardship organization to develop an accounting system that can provide State-specific data.
- Products available for collection may need to be generated from historic sales data derived from product life cycle and consumer behavior estimates or assumptions. For example, 40% of televisions are used for 3 years before discard/replacement, 30% for 5 years, 20% for 10 years, etc. Sales data or product/materials available for collection from other States' (or provinces) product stewardship programs, adjusted for population, may be used as a surrogate. Or national sales data may be parsed based on State population as a percentage of national population.

Keep a record of assumptions: Any assumptions or estimates used to derive performance indicators, as well as the sources of such assumptions and estimates, should be clearly stated. Readers would thus be able to drill down into the data from the assumptions. Consider having a page or section where assumptions are listed or consider using footnotes. Over the long term, it may be useful to put assumptions in one place for reference to help in comparing programs. If data are based on similar programs in other States or countries, that should be clearly stated along with the reasons that State-specific data were not used or were not available.

How to ensure data are available in the long-term: Given that the data for some performance indicators may be expensive to purchase or time-consuming to derive, it can be important to clearly state the entity(ies) responsible for obtaining or deriving those data in the product

stewardship program requirements. The producer partners in the program are more likely than government entities to have adequate resources for this over the long term. Associated costs could be built into the product stewardship program financing (e.g., advance recovery or eco-fees) or assigned to producer partners based on some formula.

Case Studies for Product Stewardship Program Evaluation

The Task Force provides the following case studies for program evaluation. These represent product stewardship programs active in the States of the Task Force membership. The programs selected reflect a diversity of products and geographic locations in the U.S. These programs also illustrate a few of the types of EPR policy strategies that are active in the U.S.

1. Iowa mercury switch law[6]
2. California carpet law[7]
3. Maryland waste electronics law[8]
4. Washington waste electronics law[9]

The case studies presented in Appendix B show how a State can customize the program metrics for its program and how the metrics may vary by product type. The tables in Appendix B present performance indicators (discussed in the "Overview of Program Metrics" section) for four active programs. When the data presented in the case studies are tracked over time, they can be used to help answer the "Principle Questions for Program Evaluation".

Appendix B provides data from two electronics recycling programs: Maryland and Washington State. Selected data from the case studies are presented in Tables 1 and 2 below as an example of how difficult it is to compare one program to another.

Maryland data represents electronic recycling reports from counties and State agencies. Businesses are not required to report on their electronics recycling activities. The program cost for Maryland does not include the recyclers' costs, nor all the county or State agency costs associated with collections. The majority of the costs of electronics recycling from households are borne by the counties through their voluntary programs. The costs reported by the counties are not all inclusive – they only represent the recycling contractors' charges and advertisement costs. Total Maryland program cost is higher than shown. Manufacturer take-back program data (pounds and costs) are not included in the collection data.

Washington data represents the recycling program operated by a product stewardship organization. All product stewardship program costs are funded by manufacturers and reported annually to the Washington State Department of Ecology. The majority of the Washington program collection comes from household electronics (98.7%). The largest proportion of product collected, by weight, is televisions (74%).

[6] http://www.iowadnr.gov/Environment/LandStewardship/WasteManagement/Recycling/MercuryRecycling/SwitchesfromVehicles.aspx
[7] http://www.calrecycle.ca.gov/Carpet/Law.htm
[8] http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/SpecialProjects/Pages/programs/landprograms/recycling/specialprojects/ecycling.aspx
[9] http://www.ecy.wa.gov/programs/swfa/eproductrecycle/

Table 1 – Program Summary Information

Program Data	Maryland (2011)	Washington (2011)
State Population	5,828,589	6,767,900
Number of producers	203	268
Products accepted	Computers, monitors, laptops, televisions and other video display devices	Computers, monitors, televisions, laptops, and E-readers
Who can drop off product	Households, businesses, governments	Households, schools, small businesses, and small governments
Pounds of product collected	17,591,221	42,193,028
Total program costs	$624,640	$11,138,066

The key performance indicators in Table 2 show how the data from two programs can vary greatly. Both States offer recycling programs for similar electronic products, but the data recorded for each program is different. This is an example of why it is difficult to compare one program to the other and draw conclusions without understanding the differences. The data reported by Maryland includes only county and State agency collection data but not manufacturer take-back data. The data reported by Washington comes from the Statewide product stewardship program operator that includes data from participating collectors, which can include counties, retailers, and manufacturers.

Table 2 – Key Performance Indicators

Select Key Performance Indicators	Maryland (2011)	Washington (2011)
Weight collected for recovery/capita	3.02 lbs/capita	6.23 lb/capita
Program cost per capita (State)	$0.11/capita	$ 1.60 /capita
Cost/weight recycled	$0.038/lb	$0.245/lb
Cost/weight collected for recovery	$0.036/lb	$ 0.256/lb

Key Lessons Learned from Case Studies

- Even when data for several or many performance indicators are not available, it may still be possible to adequately evaluate program performance using data required by statute or regulation.
- It is important that authorizing legislation identify the producer role for providing data and identify key performance indicators to be used to measure program success. In legislation or regulations (for States where regulations are used), language needs to define specific metrics or provide a process to define these metrics.
- It is important for legislation to include the producer requirement to fund State agency oversight, otherwise the resources for this activity may be unavailable. This is a concern when the program uses an eco-fee that requires State approval.

- Producers often do not collect sales data by State because they use distribution regions with different geographical boundaries. This is not to say the State-specific data cannot be collected in the future, but producers may need time to develop the accounting systems so it can be done efficiently and accurately. If the collection of State sales data adds a significant cost to program administration, consider whether those additional costs add sufficient value to the performance measure when compared to using estimates of State sales data (e.g., prorating national or regional sales data based on State population).
- Typically job creation is not tracked, in part, due to the difficulty in establishing a direct correlation to impacts of a law. Annual surveys can be used to collect data and over time this can show approximate changes in the number of jobs.
- Simple metrics may need detailed explanations about how each metric is defined and the data sources. For example, what is included or excluded from the product definition? Are containers or packaging included or excluded? Is the value of donated space included or excluded as a cost?
- It is extremely important to note what assumptions are made in calculations. Plans and reports should explain how estimates are derived (e.g., explain how State data are estimated) if data are estimated, what formulas are used, and which sources of data are used for each factor in a formula.
- It may take several years of tracking metrics to understand overall program success and be in a position to answer the principle questions for program evaluation.

Task Force Recommendations

The Product Stewardship Task Force offers the following recommendations for the additional consideration of States using the tool:

- Consider if the authorizing statute emphasizes the environmental and economic outcomes desired of the program rather than prescribing details as to how the program should function. Policymakers are encouraged to refer to product stewardship principles or checklists to ensure key elements necessary for a successful program are considered in bills.
- The stewardship plan details producer and stewardship organization responsibilities. It is important that this plan outline program implementation strategies; responsibilities for program development; detail requirements for outreach to stakeholders including local government, processors, retailers and waste management companies among others; and detail requirements to make adjustments to their program to ensure successful implementation. This plan should include detailed requirements for program metrics.
- The role of State agencies includes providing program oversight, ensuring compliance and providing evaluation and program analysis to policymakers. Using the evaluation tool is intended to be helpful in providing this oversight and evaluation.

Appendix A - Summary of Literature and Resources

Other resources for measuring or evaluating product stewardship programs are listed below. Some of these materials were used in the development of the evaluation tool detailed in this paper (footnotes are repeated in this list).

- **ASTSWMO Product Stewardship Framework Policy Document. December 2009.** http://astswmo.org/Files/Resources/Sustainability/ASTSWMO_Product_Stewardship_Framework_Policy_Document-Dec2009.pdf
- **British Columbia Ministry of Environment. "Third Party Assurance Requirements for Non-Financial Information"** approved under the Province's Recycling Regulation (Section 8(2)(h)). July 2012.
- **California Department of Resources Recycling and Recovery: Sample Summary of Impacts for Product Management Programs.** April 20, 2010. http://www.calrecycle.ca.gov/EPR/Impacts/Sample.pdf
- **California Department of Resources Recycling and Recovery** product stewardship legislation checklist, discussion draft October 2010. http://www.calrecycle.ca.gov/epr/Framework/Checklist.pdf
- **CCME EPR Product Evaluation Tool, User Guidance (PN 1397),** Canadian Council of Ministers of the Environment, developed by Marbek Resource Consultants, Ltd, 2008. This tool is to help select products for EPR programs: http://www.ccme.ca/files/Resources/waste/extended/pn_1397_epr_guidance_manual_e.pdf
- **CCME Extended Producer Responsibility (EPR) Program Measurement and Tracking Final Report** - Prepared For Canadian Council of Ministers of the Environment (CCME) by Kelleher Environmental, December 10, 2008.
- **Environment Canada.** "Performance Measurement and Reporting for EPR Programs: Reporting Guidance Document", prepared by Stratos Consultants in October 2007.
- **Evaluation Tool for EPR Programs,** Thomas Lindhqvist and Chris van Rossem, 2005.
- **Extended Producer Responsibility Canada** website: http://www.eprcanada.ca/
- **Extending Producer Responsibility: An Evaluation Framework for Product Take-Back Policies;** Michael W. Toffel, Antoinette Stein, and Katharine L. Lee, Harvard Business School working paper 09-026, 2008. http://www.hbs.edu/research/pdf/09-026.pdf
- **Product Stewardship and Extended Producer Responsibility: Definitions and Principles.** Developed in collaboration by the Product Stewardship Institute, with the Product Policy Institute and the California Product Stewardship Council, 2012. http://calpsc.org/about-cpsc/15-cpsc-parent-category/home-page/40-epr-principles
- **U.S. EPA Solid Waste Management Hierarchy** http://www.epa.gov/osw/nonhaz/municipal/hierarchy.htm
- **U.S. EPA Waste Reduction Model (WARM)** http://www.epa.gov/climatechange/waste/calculators/Warm_home.html

Links to Case Study program websites:

Iowa mercury switches:

- http://www.iowadnr.gov/Environment/LandStewardship/WasteManagement/Recycling/MercuryRecycling/SwitchesfromVehicles.aspx

California carpet:

- http://www.calrecycle.ca.gov/Carpet/Law.htm

Maryland electronics:

- http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/SpecialProjects/Pages/programs/landprograms/recycling/specialprojects/ecycling.aspx

Washington electronics:

- http://www.ecy.wa.gov/programs/swfa/eproductrecycle/

Appendix B – Case Studies

The following case studies present program metrics for four active U.S. product stewardship programs. Data cited in the case studies is primarily from 2011 and/or 2012. The data presented in each case study use customized program metrics that show how the metrics vary by product type. When tracked over the long term, these performance indicators can be used to help answer the principle program evaluation questions.

Case Study 1:	Iowa mercury switches in vehicles
Case Study 2:	California carpet stewardship program
Case Study 3:	Maryland waste electronics recycling program
Case Study 4:	Washington State waste electronics recycling program

Every effort has been made for consistency in the program metrics reported in these case studies. While the comparison of many metrics is relatively straightforward, comparisons of some metrics may involve more details or discussion with program managers to understand exactly how the metric was calculated or developed.

For example, “product collected” is typically a hard number obtained via required reports from the product stewardship program. Counting or weighing the products collected is based on observed counts or weights. “Product available for collection” on the other hand is rarely based on exact State-by-State market data but more often estimated from national or regional market data using the percentage of State population of the national or regional market population. To further complicate comparison, product longevity assumptions are used to estimate when a product reaches the end of its life and is actually ready to be discarded and collected. For example, the assumption may be that 30% of flat screen displays last up to 3 years, 60% last up to 7 years, 10% last up to 10 years. Different States may use different product longevity assumptions.

Cost data may be more easily compared for some indicators than others. “End of life materials management” includes what it costs to collect and recycle the product and can include promotion, administration, bounties. For example, these costs in the Iowa Mercury Switch case study include the $5 bounty and collection, transportation and disposal. In the Maryland Electronics case study, it is clear that the costs do not include a bounty and include not only collection and recycling but also promotion and administration. Comparison is relatively straightforward as the components of the cost are detailed. On the other hand, “Education/Communication” costs may be known or estimated but without more detail about the education/communication program elements, it is difficult to evaluate the quality and robustness of the program. Is it simply a website, a toll free number and some brochures or product inserts or does it include an ongoing multi-faceted marketing plan?

Straightforward comparisons of the program metrics are useful for a quick, initial look. If policy or program changes are based on comparison with other States, a more in-depth analysis is recommended.

Case Study 1: Iowa Mercury Switches in Vehicles

Iowa's Mercury Free Recycling Act requires auto manufactures to implement and finance a program for the collection and proper recycling of mercury switches used in trunk and hood lights. Auto manufacturers formed End-of-Life Vehicle Solutions (ELVS) to meet the requirements of the law on their behalf. ELVS provides buckets for the collection of the switches to auto recyclers. The auto recyclers are required by law to remove the mercury switches. Once they have filled the collection container or within one year of when the first switch was placed in the container, the auto recycler sends the bucket to the mercury processor contracted by ELVS using a pre-paid postage label provided by ELVS. ELVS pays the auto recycler a $5.00 per switch bounty. Mercury containing anti-lock breaking systems (ABS) are not covered by the law. As a result, auto recyclers are not required to remove them and do not receive a bounty for them. However, if auto recyclers do chose to remove them, they may be included in the bucket and ELVS will recycle them at no cost. Several States have similar laws and the program is provided on a voluntary basis without the bounty to all other States. This law passed in 2006 and the program was underway by January 2007.

Iowa law requirements:

- All mercury containing switches from trunk and hood lights must be removed prior to delivery of the vehicle to the scrap recycling facility unless the switch is inaccessible due to damage to the vehicle.
- Participation in the program is required for anyone that is in the business of acquiring, dismantling or destroying six or more vehicles in a calendar year for the primary purpose of resale of the vehicle's parts.
- Participation is also required for anyone who received vehicles from the "Cash for Clunkers" program (Federal law).
- Vehicle manufacturers will reimburse vehicle recyclers for their labor to remove the mercury switches at the rate of $5 for each switch with a proper VIN number.
- Mercury switches may not be stored for more than one year.

Performance Indicator	**Iowa Mercury Switch (2012)**
Total program cost ($)	
Cost($)/capita – CY2011 local government costs	$0
CY 2011 State Costs	$person
Education/Communications	State - $300 Producers – Unknown
End of life materials management ($5.00 bounty, collection, transportation & disposal costs; all covered by producers	$80,845 in bounties, other costs unknown.
Program administration (% of total program cost)	Unknown – provided by producers
Governance (program oversight) (State)	The program is administered as part of the solid waste programs. Costs specific to this program are not known.

Performance Indicator	Iowa Mercury Switch (2012)
Environmental	
Materials management[10]	
Product sold (mass or volume)	Mercury switches are no longer used in vehicles.
Product collected (mass or volume)	16,169 switches containing 35.11 pounds of mercury in CY 2012
Product available for collection	Vehicles scrapped in Iowa in 2012 contained approximately 54,000 mercury switches.
Percent collected (from available for collection)	30%
Percent reused	None
Percent recycled	100% of what is collected
Percent other *(e.g., landfilled, incinerated for energy recovery, etc.)*	If for some reason a switch cannot be recycled, it is disposed of as a hazardous waste.
Greenhouse gas emissions (tons)	
$ invested in product design, research and development	
Program effectiveness	
Progress against goals and targets	The goal in legislation is 90% recovery rate. The actual recovery rate for 2012 was 30%.
Regulatory non-compliances	One Notice of Violation was issued to a producer. Site visits have been made to vehicle recyclers that have not sent in switches to assist them.
Demonstrated improvements in product design	The auto industry switched to all non-mercury switches prior to this program.
Public awareness	Not applicable
Public participation[11]	35% of the auto recyclers that enrolled in the program sent in a container of switches in 2012. Containers are provided to all auto recyclers at no charge.
Total job change from traditional to EPR (+/-/=)	Base year used in comparison: _____
Local Government	Not Applicable
Product Stewards	Unknown
State Government	0
Materials extraction, processing, & manufacturing	Unknown
Collectors & Recyclers	Unknown
Retailers	Not Applicable

[10] In some cases, it may be necessary to convert unit to material vs. product (e.g., use data on amount of cadmium recycled from an industry association to determine amount of batteries collected)

[11] Via survey results or other reported data (such as Form 303 in CA, which local jurisdictions must report http://www.calrecycle.ca.gov/HomeHazWaste/Reporting/

Case Study 2: California Carpet Stewardship Program

California established a private sector designed and managed statewide carpet extended producer responsibility (EPR) program in July 2011. This program follows producer responsibility principles to ensure that over time discarded carpets become a resource for new products in a manner that is sustainably funded and provides jobs for Californians. The statute, AB 2398, designated Carpet America Recovery Effort (CARE) as the sole stewardship organization until 2015. CARE developed a California Carpet Stewardship Plan (Plan) for CalRecycle review and approval. CalRecycle conditionally approved the Plan in January 2012.[12] CARE implements the program with its manufacturing and recycling partners whose processing facilities accept old carpet and produce material feed stocks that are used in new products.

The statute allows considerable flexibility to CARE in the design and implementation of the program as long as there is continuous meaningful improvement. The Plan established an incentive program, rather than a full EPR program, whereby recycling processors are paid a subsidy for the material they sell as a new commodity. CARE considers this a performance driven incentive program. The program is designed to tip the balance and make recycling economically viable, rather than paying for all collection and recycling costs. This feature makes it unique among EPR-type programs.

The law encouraged the development of several new carpet recycling facilities in California.[13] The program shows many positive upwards trends in the amounts of carpet recovered and recycled output. Key challenges include:

1 Establishing the method that will be used to measure progress,
2 Establishing programs in rural counties so there is full program coverage,
3 Finding new markets for the non-nylon carpet fibers, especially polyesters, which are increasingly used in new carpet,
4 Managing the cyclical ebbs and flows of a carpet recycling system, and
5 Ensuring start-up companies better understand CARE's requirements, state laws and regulations, challenges of carpet recycling, etc.

For more information visit: www.calRecycle.ca.gov/carpet

- Details on measurement and assumptions: see "Stewardship Plan"
- Updates: See "Program Overview/ Results and Benefits" and the CARE Annual Report.

The table below contains key data fields to use in understanding program effectiveness. Data for a one time-period presents a snapshot in time. When compared to the same data for different time periods, it is possible to see trends. Data are available for the first year and a half of the program and presented in 6 month increments of time. See the website noted above for more recent information.

[12] CARE submitted a revised Carpet Stewardship Plan May of 2013 to CalRecycle. CalRecycle disapproved this revised Plan and CARE is preparing an updated Plan fall of 2013 that will address several topics including additional or modified market-based incentives, higher recycling goals, program staff in California, additional education and outreach, financial assurance and amount of reserved funds.

[13] New facilities have experienced shut downs and CARE is updating the Plan to address issues.

Performance Indicator	California Carpet (2011 Jul-Dec 6 months)	California Carpet (2012 Jan–Jun 6 months)	California Carpet (2012 July-Dec 6 months)
KEY Performance Indicators			
Pounds collected/capita	1.58	1.65	1.67
Units of product available for collection	181 million lbs	174 million lbs	182 million lbs
Cost/pound collected	$.02	$.02	$.03
Cost/pound recycled	$.097	$.067	$.08
Total program costs (incentive payments, oversight, administration) [14]	$1,149,000	$1,136,000	$1,597,000
Recycling rate expressed as units/weight recycled divided by units/weight available for collection[15]	6.6 %	9 %	11.3 %
Population of State[16]	37,683,933	37,866,671	38,041,430
Number of stewardship organizations/manufacturers	1 / 80	1 / 80	1 / 81
Overview of costs			
Education/Communications (% of total program cost)	Not separately reported	Not separately reported	Not separately reported
End of life materials management $ (Funds paid to processors)	$703,454	$894,000	$1,207,000
Program administration $	$320,504	$117,091	$265,000

[14] CARE program costs associated with AB2398. The program doesn't pay directly for collection, transportation or recycling because it is designed as an incentive program with subsidies provided to processors for their recycled output.

[15] Refers to recycled output, i.e., materials leaving a processing facility. Does not include residue from the recycling process.

[16] Source: http://quickfacts.census.gov/qfd/states/06000.html

Performance Indicator	California Carpet (2011 Jul-Dec 6 months)	California Carpet (2012 Jan–Jun 6 months)	California Carpet (2012 July-Dec 6 months)
Governance (program oversight)[17] $	$125,000	$125,000	$125,000
End of life materials management (% of total program cost[18]) - Funds paid to processors	61%	65%	88%
Program administration (% of total program cost)	27%	9%	19%
Governance (program oversight) (% of total program cost)	11%	9%	9%
Total cost to local government (if applicable) [19]	Unknown	Unknown	Unknown
Total Program Costs [12]	$1,148,958	$1,136,091	$1,597,000
Total Program Funds received (millions of dollars)	$2.53	$2.38	$2.52
Funds available to distribute (millions of dollars)	$1.37	$2.27	$3.06
Environmental			
Product available for collection (millions of pounds)[20]	181	174	182
Product collected (millions of pounds)	60	63	64

[17] This reflects the budgeted amount. The start-up costs are invoiced over three years. There is an annual cap not to exceed 5% of Program funds received, which roughly amounts to $125K per quarter.

[18] Due to rounding the amounts for the various expenditure categories do not add up to 100%

[19] Tipping fees vary widely across jurisdictions; average is $40-45/ton (but some are over $100/ton). There is cost of space taken up by carpet in landfills that can be viewed as a savings when carpet diverted.

[20] The number is estimated through a formula developed by CARE. The key input to the formula is carpet sales in California, which is then adjusted. For more explanation refer to the Carpet Stewardship Plan, available at www.calrecycle.ca.gov/carpet.

Performance Indicator	California Carpet (2011 Jul-Dec 6 months)	California Carpet (2012 Jan–Jun 6 months)	California Carpet (2012 July-Dec 6 months)
Product recycled (millions of pounds)[21]	12	17	20
Percent collected (from available for collection)[22]	27%	29%	34%
Percent reused	Unknown	76,000 lbs	76,000 lbs[23]
Percent recycled	6.6 %	9%	11.3 %
Percent other *(e.g., landfilled, incinerated for energy recovery, etc.)*	93	91	89
Greenhouse gas emissions (tons)	Unknown	Unknown	Unknown, CA Air Resource Board starting analysis
$ invested in product design research and development	Unknown, but anecdotally occurring.	Unknown, but anecdotally occurring	Unknown, but anecdotally occurring
$ invested in recycling infrastructure (e.g., equipment)	Unknown	Greater than $6,000,000	Unknown
Program effectiveness			
Progress against goals/targets	**Percent recycled output:** Goal 11% - Achieved 6.6%	**Percent recycled output:** Goal 12% - Achieved 9%	**Percent recycled output:** Goal 12% - Achieved 11.3%
Regulatory non-compliances	0	0	1[24]
Estimated percentage of producers who are not participating in program (free-riders)	Thought to be zero or near zero	9 smaller companies did not report	6-7 smaller companies did not report

[21] This refers to "Recycled output", which is material that has been processed into a new commodity that is then shipped and sold as reported to CARE by processors seeking subsidy payments. It does not include residues from the recycling process that are disposed.

[22] Carpet has a high residual rate and that makes the recycled output, which doesn't include residual, more meaningful.

[23] The yearly average was prorated.

[24] The non-compliance resulted from too much carpet being stored at a site.

Performance Indicator	California Carpet (2011 Jul-Dec 6 months)	California Carpet (2012 Jan–Jun 6 months)	California Carpet (2012 July-Dec 6 months)
Demonstrated improvements in product design	Unknown	Unknown	Several identified[25]
Public awareness	Outreach materials to 3500 retailers/distributors prior to July 1, 2011	Unknown	Through rural pilot some public education was developed.
Percent of population with access to recycling services in their counties	98%[26]	98% plus 6 rural counties in pilot study	98% plus 6 rural counties in pilot study
Total jobs			
Local Government	Unknown	Unknown	Unknown
Product Stewards[27]	2 +	2+	2+
State Government[28]	2	2	2
Materials extraction, processing, & manufacturing	Unknown	Unknown	Unknown
Collectors & Recyclers	150[29]	204[30]	210 in-state, 532[31] total
Retailers	Unknown	Unknown	Unknown

[25] The Draft AB2398 Annual Report from July 2013 notes several examples that have occurred over multiple years. This includes examples of products that are homogeneous to facilitate recycling, reduced adhesives, dematerialization, increases in carpet to carpet recycling.

[26] As reported by CARE in the December 2011 California Carpet Stewardship Plan. This doesn't mean that all counties have recycling services. Many rural counties are represented in the 2% without recycling services. Efforts are underway to address this issue.

[27] The "+" is added because the number does not reflect additional contract services hired by the Stewardship Organization and volunteered support by its members.

[28] This approximates the amount budgeted. The way the law is written, payments for the regulatory development phase are paid over three year years and there is a cap on the amount State government can invoice the stewardship organization (5% of the total program).

[29] As reported by CARE in the Dec 2011 Carpet Stewardship Plan submitted to CalRecycle.

[30] As reported by CARE in the April 2012 Annual Report.

[31] As reported by CARE in the April 2013 at the CARE Annual Conference. In the AB2398 Annual Report this number for in-State recycling only was reported as 210. Some recycling occurs out of State.

Case Study 3: Maryland Electronics Recycling Program

Maryland's Statewide Electronics Recycling Program law (§§ 9-1701, 9-1703 (c), 9-1707 (f), and 9-1727 through 9-1730 of the Environment Article, Annotated Code of Maryland) is the third electronics recycling law to be enacted in the U.S. (2005) and is a producer responsibility law. The scope of the law includes computers, computer monitors, televisions and other video display devices. Electronics manufacturers are required to register and pay a fee annually by March 1st in order to sell, or offer for sale, their products in the State. The registration fee is based on sales of a manufacturer's electronics in Maryland in the prior calendar year and a manufacturer that has implemented an approved take back program for their products for Maryland returners is entitled to a reduced annual renewal registration fee. Manufacturers' take back programs must be free to the returner, and contracted with a recycler, local government, other manufacturer, or other person for the collection, recycling, refurbishing or reuse of a covered electronic device. Take back programs must also include educational and instructional materials relating to the destruction and sanitization of data from a covered electronic device. Retailers may not sell a covered electronic device in the State unless the manufacturer of the product is in compliance with the law. Manufacturer registration fees may be used to provide grants to counties and municipalities for electronics recycling programs. It should be noted that the manufacturer registration fees do not pay for the recycling of all electronics in Maryland. For more information about Maryland's Statewide Electronics Recycling Program law, please visit the Maryland Department of the Environment's website at: http://www.mde.state.md.us/ecycling

Performance Indicator	**Maryland (2011)**
KEY Performance Indicators	
Weight collected for recovery/capita[32]	3.02 lbs/capita
Units of product available for collection	Unknown – information not collected at the time the case study was prepared.
Cost/weight collected for recovery	Unknown – information not collected
Cost/weight recycled	$0.038/lb
Total program costs (collection, recycling, promotion, administration)	$624,640
Recycling rate expressed as units/weight recycled divided by units/weight available for collection	Unknown – information not collected at the time the case study was prepared.
Population (insert year)* (US Census Bureau)	5,828,589 March 2013 estimate
Number of producers	203 manufacturers
Pounds of product collected	17,591,221
Program Cost	$624,640
Program cost per pound	$0.038/lb
Program cost per capita (State)	$0.11/capita

[32] Based on 17,591,221 pounds of material collected

Performance Indicator	Maryland (2011)
Number of Units collected	Unknown – information not collected
Cost per unit	Unknown – information not collected
Total program cost ($)	$624,640
Cost($)/capita – CY2011 County Costs only ($429,475/5,828,589)	$0.074/person
CY 2011 County and FY2011 State Costs ($624,640/5,828,589)	$0.11/person
Cost ($)/unit collected – CY2011 County Cost only ($429,475/16,290,780)[33]	$0.026/pound
FY2011 State and CY2011 County Costs	$0.038/pound
Education/Communications (% of total program cost) – for CY2011 County events only	3.5%
End of life materials management (% of total program cost) – for CY2011 County events only	96.5%
Program administration (% of total program cost)	Unknown but possibly obtainable
Governance (program oversight) (% of total program cost) FY2011 State costs	$195,165
Total cost to local government (if applicable) CY2011	$429,475
Total FY2011 State and CY2011 County Costs	$624,640
Environmental	
Materials management	Unknown
Product sold (mass or volume)	Unknown – not available at the time the case study was prepared.
Product collected (mass or volume)	17,591,221 pounds
Product sold that is available for collection	Unknown – not available at the time the case study was prepared.
Percent collected (from available for collection)	Unknown – not available at the time the case study was prepared.
Percent reused	Unknown – reused is considered recycled in MD
Percent recycled	Approximately 100% of what is collected – do not collect this directly – anecdotal

[33] Based on 16,290,780 pounds of material collected; no cost data for 1,300,441 pounds of total 17,591,221 pounds collected

Note: County costs do not include costs for 1,300,441 pounds of material collected

Note: There have been not State issued grants to local governments for 3 years so State costs are lower than normal.

Performance Indicator	Maryland (2011)
Percent other *(e.g., landfilled, incinerated for energy recovery, etc.)*	Unknown – data not collected
Greenhouse gas emissions (tons)	Unknown – information not collected
$ invested in product design research and development	Unknown – data not collected
Program effectiveness	
Progress against goals and targets	Program does not have legislated goals or targets
Regulatory non-compliances	Unknown at this time, but obtainable
Demonstrated improvements in product design	Unknown
Public awareness	2006 survey indicated 60% of respondents aware of need to handle electronics properly and/or recycle them
Public participation	Only known for recycling events
Total job change from traditional to EPR (+/-/=)	Base year used in comparison: Unknown
Local Government	Unknown
Product Stewards	Unknown
State Government	No permanent full time staff – no change
Materials extraction, processing, & manufacturing	Unknown
Collectors & Recyclers	Unknown
Retailers	Unknown

Case Study 4: Washington State Electronics Recycling Program

Washington State's Electronic Product Recycling Law (Chapter 70.95N RCW) and Rules (Chapter 173-900 WAC) require producers to provide recycling services at no cost to households, small businesses (less than 50 employees), charities, school districts and small governments (counties with less than 125,000 residents) in Washington as of January 1, 2009.

Producers of TVs, computers (desktops and laptops), monitors and e-readers must finance the collection, transportation and recycling of these products. There must be a collection site in every county and one in every city with a population of 10,000 or more. The law requires producers to register with the Washington State Department of Ecology and participate in an approved recycling plan in order to sell their products in or into the State by any means including internet sales. The law also created the Washington Materials Management & Financing Authority (http://www.wmmfa.net/), to administer and operate the Standard Plan for electronics recycling. By default, all producers must participate in the Standard Plan unless they meet the requirements to operate their own independent recycling plan.

More information about the program is available at Ecology's website:
http://www.ecy.wa.gov/programs/swfa/eproductrecycle/

The table below contains key data fields to use in understanding program effectiveness. Data for a one time-period presents a snapshot in time. When compared to the same data for different time periods, it is possible to see trends.

Performance Indicator	**Washington (2011)**
KEY Performance Indicators	
Weight collected for recovery/capita[34]	6.23 lb/cap
Units of product available for collection	Unknown
Cost/weight collected for recovery	$ 0.256/lb
Cost/weight recycled	$0.245/lb
Total program costs (collection, recycling, promotion, administration)	$11,138,066
Recycling rate expressed as units/weight recycled divided by units/weight available for collection	Unknown
Population (insert year)* (US Census Bureau)	6,767,900
Number of producers(80 pay State oversight fees)	250-300
Pounds of product collected	42,193,038 lbs
Program Cost	$10,782,066
Program cost per pound	$ 0.256 per pound[35]
Program cost per capita (State)	$ 1.60 per person
Number of Units collected	915,000
Cost per unit	$11.78 /unit

[34] Fee adjustment to $0.35 per pound - http://www.ecy.wa.gov/programs/swfa/eproductrecycle/docs/Final_Determination.pdf

[35] Fee adjustment to $0.35 per pound - http://www.ecy.wa.gov/programs/swfa/eproductrecycle/docs/Final_Determination.pdf

Performance Indicator	Washington (2011)
Total program cost ($)	
Cost($)/capita	$ 1.60 per person
Education/Communications (% of total program cost)	Unknown
End of life materials management (% of total program cost)	96% for WMMFA [36]
Program administration (% of total program cost)	4% for WMMFA
Governance (program oversight) (% of total program cost)	$ 356,000[37] (2.5 State FTEs)
Total cost to local government (if applicable)	None
Total Costs	$11,138,066
Environmental	
Materials management	
Product sold (mass or volume)	Unknown
Product collected (mass or volume)	42,193,038 lbs
Product sold that is available for collection	Unknown
Percent collected (from available for collection)	Unknown
Percent reused	0.12% (52,848 lbs)
Percent recycled	96% (40,877,445 lbs)
Percent other *(e.g., landfilled, incinerated for energy recovery, etc.)*	3% (1,315,593 lbs)
Greenhouse gas emissions (tons)	Unknown
$ invested in product design research and development	Unknown
Program effectiveness	
Progress against goals and targets	No goals/targets
Regulatory non-compliances	Unknown
Demonstrated improvements in product design	Unknown
Convenience	90% of the State has a collection site within 10 miles of their home
Public awareness	Unknown
Public participation	Unknown
Total job change from traditional to EPR (+/-/=)	Base year used in comparison: 2008
Local Government	Unknown
Product Stewards	2
State Government	2.5 FTE
Materials extraction, processing, & manufacturing	Unknown
Collectors & Recyclers	80+[38]
Retailers	Unknown

[36] 2011 WMMFA (Washington Materials Management and Financing Authority) annual report - http://www.ecy.wa.gov/programs/swfa/eproductrecycle/docs/2011AnnualReportfromWMMFA.pdf

[37] Ecology annual tier set list - http://www.ecy.wa.gov/programs/swfa/eproductrecycle/docs/2013TierByName.pdf

[38] Northwest Product Stewardship Council (NWPSC) E-Cycle summary - http://www.productstewardship.net/PDFs/productsElectronicsEcycle2011FactSheet.pdf