

Recycling Reinvented

Extended Producer Responsibility Cost-Benefit Study

Working Paper #1: Study Design

Prepared by the Reclay StewardEdge Consulting Team for Recycling Reinvented

July 29, 2013

About this Study

Study Team

This study is being conducted by a consultant team led by **Reclay StewardEdge**, a consultancy with deep experience and expertise in sustainability issues related to the end-of-life management of packaging and products, for Recycling Reinvented.

Reclay StewardEdge provides research, analysis, market development, and program management services related to product stewardship and extended producer responsibility to clients in North America and internationally.

Study Goals

The purpose of the study is to help Recycling Reinvented and other stakeholders better understand and evaluate the possible impacts, including costs and benefits, of implementing a state-level extended producer responsibility (EPR) system for consumer packaging and printed paper (PPP) in the U.S.

The study is designed to be objective, rigorous, and transparent. The goal of the Reclay StewardEdge consulting team is to conduct a fact-based and independent analysis, clearly documenting all assumptions and data sources, that can help advance the national dialogue on how to achieve higher recycling rates, greater system efficiency, and sustainably financed recycling programs.

Working Paper Overview

This working paper, which is the first of three to be developed as part of this study, presents the overarching methodology, definitions, and assumptions that form the basis of the study design.

Working Paper #1 is organized as follows:

- Definition of EPR and key terms for the purposes of this study
- Recycling Reinvented goals for EPR
- Study scope and constraints
- Study process, products, and timeline
- Summary of study review process
- Overview of the EPR system modeling framework to be developed for this study
- Definitions and assumptions related to EPR system to be modeled
- Principles and assumptions related to the producer financing scenario for the EPR system to be modeled

Subsequent working papers will present study findings along with detailed information about the applied analytical methodologies, data sources, and discussion of limitations.

What is Extended Producer Responsibility?

Extended producer responsibility (EPR) is a mandated form of product stewardship that establishes a producer's responsibility for the post-consumer management of a product and/or its packaging. EPR shifts financial and management responsibility for recycling to producers and consumers and away from the public sector and taxpayers. An EPR system is still highly dependent on consumer and/or municipal behavior/action to ensure that the EPR-designated materials are segregated and introduced into the separate collection system. EPR is intended to establish incentives to increase recycling and improve the performance of the recycling system. A recent definition developed together by the Product Policy Institute, the Product Stewardship Institute, and the California Product Stewardship Council also calls for EPR to provide incentives to producers to incorporate environmental considerations into the design of their products and packaging.

EPR is applied to a wide range of products and materials, including consumer packaging and printed paper (PPP). Many European countries have EPR policies for packaging and several Canadian provinces have EPR policies for PPP.

In the United States, the costs of collecting PPP are currently paid by taxpayers through taxes, and by ratepayers through utility bills, subscription services or hauler fees, and recycling systems are typically managed and operated by local governments and/or private sector recycling collection and processing companies.

Under EPR, producers typically form one or more producer responsibility organizations (PROs) to fulfill their obligations. Producers remit to a PRO their share of the recycling system costs and then internalize (include as a cost of doing business) these costs into the price of new products purchased by consumers. Under some EPR systems those costs become part of the producer or wholesale price of the product and in some the costs are added on as a visible fee.

PRO(s) typically contract with waste and recycling haulers, recycling facilities, and local governments to cover the costs of collection and processing of collected materials at negotiated rates. PROs are strongly incented to identify opportunities for efficiency in the recycling system to reduce costs and increase recycling rates over time.

Definitions Related to EPR

Consumer Packaging and Printed Paper (PPP):

Consumer packaging includes all materials used to protect or contain a commodity or product intended for consumption or use by an individual consumer. Printed paper includes all paper printed with text or graphics as a medium for communicating information to an individual consumer, such as newspapers, magazines, catalogs, and phone books (but not including bound reference or literary books, or text books).

PPP materials are often collected together. Combined, they represent the largest category of municipal solid waste (MSW) generated in the U.S. Once materials are collected, technology and markets exist to enable recycling of the majority (by weight) of PPP materials.

Designated Materials

Designated materials are those materials that are identified by the laws and rules establishing an EPR system as being covered by that system, and thus materials whose producers incur fees to finance the recycling system. All designated materials are typically included in the calculation of total supply of PPP, but not all designated materials are necessarily included in a producer-funded recycling collection system.

Producers

A “producer” is usually defined as the owner of the brand that is sold or distributed in a given jurisdiction (state, province, municipality) that results in discarded designated materials in that jurisdiction. If the producer is not located within the jurisdictional boundaries of the EPR system, the first importer is typically treated as the producer.

Recycling Reinvented EPR System Goals

Recycling Reinvented has three stated goals for what an EPR system for PPP should achieve:

1. Increase the tons of PPP collected and recycled and available for use in domestic manufacturing.
2. Minimize the costs incurred for increasing collection and recycling and processing of PPP.
3. Maximize the environmental benefits from recycling PPP compared to disposal, through increased collection of PPP for recycling, improving material quality, and through improvements to the recycling system and end market opportunities for PPP.

Recycling Reinvented promotes an approach to EPR that delivers a comprehensive, statewide recycling system for consumer PPP, including:

- Universal access to residential recycling service—either curbside or drop-off—for all state residents.
- Increased convenience of residential recycling service and increased opportunity for away-from-home recycling opportunities.
- Statewide harmonized and coordinated recycling promotion and education messages and campaigns.

Recycling Reinvented commissioned this study to model the potential impacts of a statewide EPR system for PPP designed to achieve its goals and to uphold its stated principles.

Study Scope

This study models one possible design of an EPR system for PPP (as envisioned by Recycling Reinvented) and models the potential impacts, including costs and benefits, compared to current conditions. This study is *not* a comparison of alternatives for improving PPP recycling either under or apart from EPR policy approaches, nor is it an evaluation of whether EPR is the best pathway for achieving such outcomes. The study team does not take a position on whether EPR should be legislated for PPP, and assumptions made related to the design of the EPR system for the purposes of modeling for this study should not be construed as recommendations or endorsements of elements for consideration in EPR legislation.

The study will focus only on the impacts of establishing an EPR program in a state, independent of other policies that could have a positive effect on recycling, such as volume-based pricing for garbage collection (PAYT), material disposal bans, and mandatory recycling. While legislation or regulations that establishes an EPR program can also include these policies, and their inclusion may increase the performance of the EPR program, they are not intrinsic to the implementation of EPR, and it is possible that an EPR program for PPP may be implemented in the absence of these supportive policies, or in a jurisdiction where these policies are already in effect.

The study analysis will model the effects of EPR in a single state (Minnesota), using state-specific data, but the methodology and modeling tools will be designed to be transferable to other states.

Minnesota was selected as the case study state through an evaluative process considering the following criteria:

- Availability of detailed and reliable data on existing collection programs (including costs), waste composition, waste/recycling tonnages and recycling rates, and processing infrastructure.
- Presence of supportive state and local policies such as a statute requiring volume-based pricing for garbage collection, and requirements for provision of recycling service in the most populous areas of the state, as well as capital investments already in place to facilitate increased recycling. The presence of these elements reduces the number of variables to control for and simplifies the modeling process.
- Relationships with state and local government and industry representatives who are willing and able to provide available information about current programs and system performance.
- Relevance of the study to current policy discussions in the state.

As part of the analysis, the study will evaluate current recycling system performance and costs in Minnesota to the extent feasible given existing data and other study constraints. These data will provide a baseline and point of reference to which the projections related to system performance and costs under the EPR system modeled can be compared.

Study Constraints

The study is focused primarily on the effects of EPR on consumer PPP discards in residential recycling systems. The analysis will not estimate potential benefits or costs from changes to other residential municipal solid waste (MSW) services that may result from EPR.

Data that distinguishes between consumer PPP discarded away from home and similar industrial, commercial, and institutional PPP is generally not available, and cost and effectiveness data for away-from-home recycling is generally lacking. Due to these limitations, this study will look at a more limited set of examples for away-from-home recycling infrastructure, constrained to what can be reliably estimated with existing data.

The system modeled for this study will represent a fully implemented early-stage EPR system. Although implementation of EPR would involve a start-up period, the model analysis assumes this transition has already occurred so that long-term costs can be compared. It is reasonable to assume that producers will incur higher annual costs than modeled by this study over an initial transitional period.

The analysis will be based on real-world data as much as possible, and data sources will be documented. However, some estimation and assumptions will be needed. When used, these will be clearly stated and described.

Some aspects of Minnesota's current landscape for recycling and waste management, such as the prevalence of open market collection services, an existing statute requiring volume-based pricing for garbage collection, and a large number of small municipalities, may be different from other states. Because these elements will affect the outcomes of the study, they may limit the study's applicability to other states.

Study Steps and Products

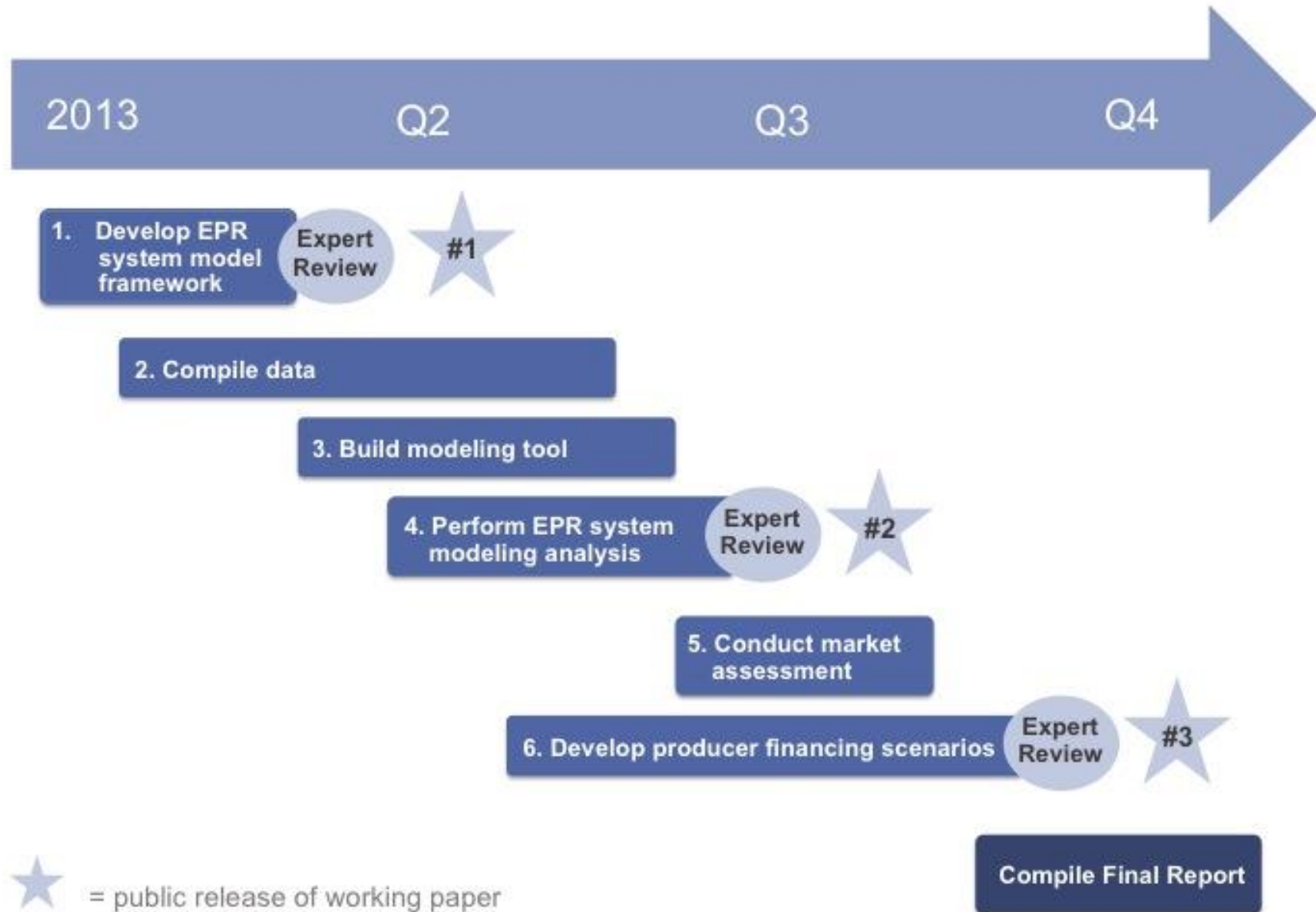
The study will be completed in six steps:

1. Develop the study methodology and assumptions that will guide the modeling and analysis of an EPR system in Minnesota (*this document*).
2. Compile existing data on the extent, performance, and costs of existing recycling systems in Minnesota and collect data needed to project the impacts and costs of practices implemented under the EPR system modeled.
3. Construct a modeling tool to facilitate data aggregation, synthesis, and analysis.
4. Using a combination of analytical techniques, model the impacts (costs and benefits) of an EPR system for Minnesota, and summarize system characteristics, performance, and costs, compared to the current system where possible.
5. Conduct market assessment, assessing the presence of domestic markets, ability of those markets to absorb additional material collected, and need for market development.
6. Using the estimated costs of the EPR system modeled (from step 4), develop a producer financing scenario and calculate potential material-specific fees based on the scenario assumptions.

Study Products

Three working papers, documenting the study findings and outcomes, will be produced over the course of the process. The working papers, enhanced through a multiple-step review process, will be compiled into a final report at the completion of the study.

Study Process Timeline



Study Review Process

To enhance the strength and credibility of the study, the consultant team will utilize an open review process, enabling interested stakeholders to provide input on the analytical methodology, data sources, assumptions, and conclusions during the course of the study.

1. Expert Review

The consultant team will work with a small group of reviewers to obtain input and feedback on each of the working papers in advance of its public release.

Reviewers are being selected by Recycling Reinvented to provide:

- Subject matter expertise
- Knowledge of policy analysis and costing methodology
- Other relevant information and technical perspectives

Reviewers will not be expected to endorse EPR or the study findings, but they will provide rigorous, third-party feedback on the study methodology. Input received from reviewers will be considered and, when appropriate and feasible, incorporated into the working papers.

2. Public Comment

Once each working paper has been reviewed by the expert review group, and any revisions have been made, the working paper will be made publicly available on a website and any interested readers will be invited to submit comments.

3. Stakeholder Outreach

Over the course of the project, Recycling Reinvented may also reach out to specific stakeholder groups to share the working papers and solicit comments directly.

Goals of the Review Process

The goal of the study's review process is to ensure the transparency of the study, and to enhance the rigor of the study methodology and the accuracy of the results.

The Reclay StewardEdge consultant team will include a summary of input and perspectives received through the review processes in the final report.

Role of Recycling Reinvented in Study Review

Recycling Reinvented has provided input to the consultant team on the study design to ensure that the EPR system modeled is consistent with Recycling Reinvented's vision for PPP EPR in U.S. Throughout the study process, Recycling Reinvented will be actively involved in the review process, seeking input from stakeholders, and will provide its own comments on study products and findings.

EPR System Model Design

The EPR system modeled for this study will be designed to achieve Recycling Reinvented's three stated goals for an EPR system through the application of specific practices that could be implemented or influenced by a PRO under an EPR system, and that have been shown to achieve these goals in other jurisdictions or studies.

Practices can be sorted into the following categories:

- Service access
- Collection
- Processing
- End Markets
- Promotion and Education
- Program Administration

The diagram on the following page presents a range of practices that could be deployed to achieve those goals and that were considered in the development of the EPR system design to be modeled for this study.

It is important to note that the model will focus exclusively on the recycling system and on practices that could be implemented or influenced by producers under EPR.

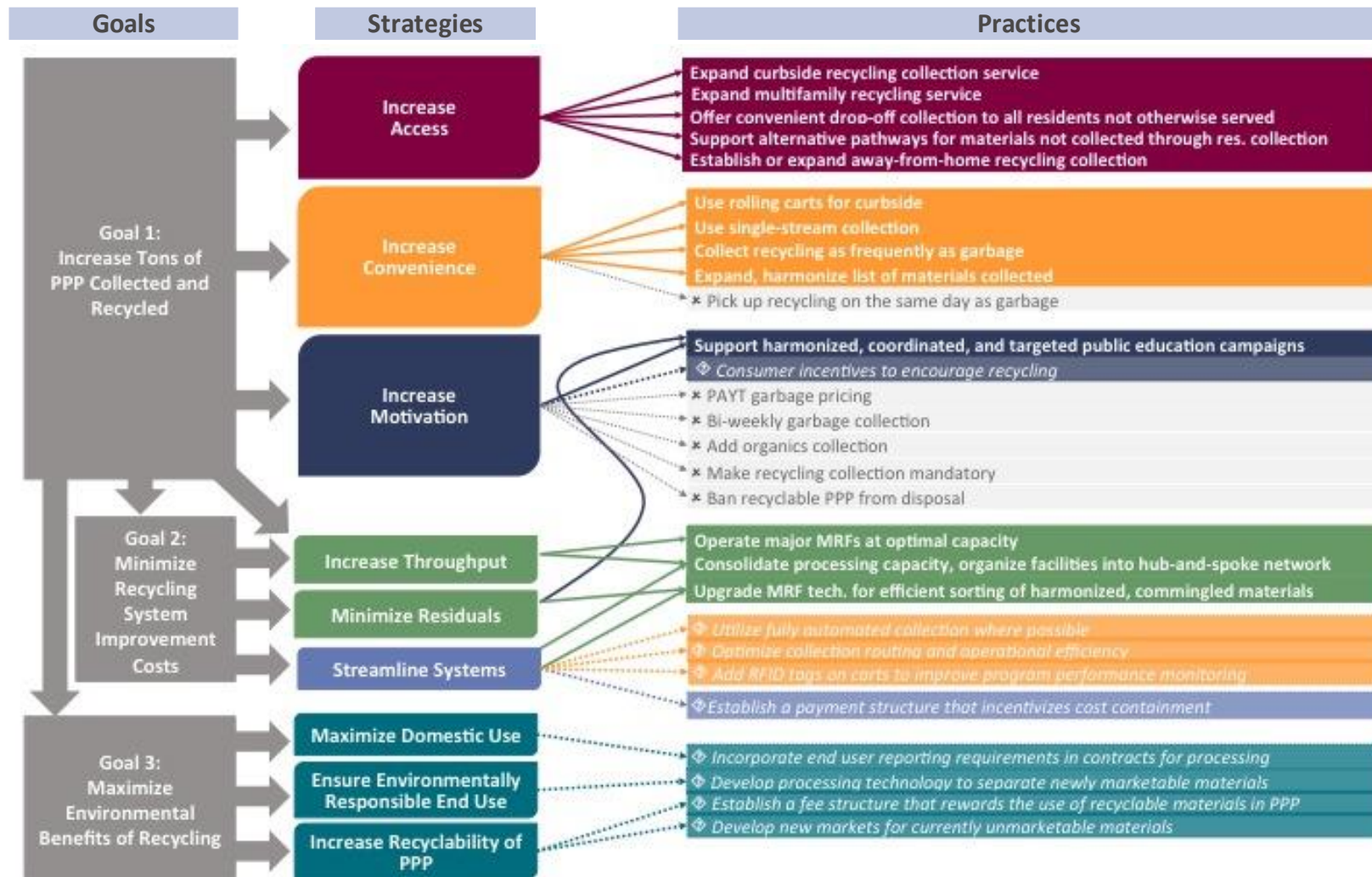
While it is assumed that, through a PRO, producers can influence the efficiency of recycling collection to a certain extent, but it is not assumed that they will be able to influence collection practices for other materials, including residual solid waste and organics. Accordingly, the model will assume no changes to collection practices for these other material streams under EPR. In addition, no additional policy changes on the part of local or state government are assumed as part of the analysis.

These assumptions mean that certain practices not in the control of a PRO, that could increase the tons of PPP collected, are assumed not to be implemented (unless they are already in place) in the EPR system modeled. Examples include:

- Pay-As-You-Throw (PAYT) residual waste pricing
- Mandatory recycling participation
- Disposal bans for recyclable PPP

For this study, the model will include only the practices for which credible real-world data on their effects are available. Practices that cannot be reliably modeled are noted in the diagram on the following page but will not be included in the analysis.

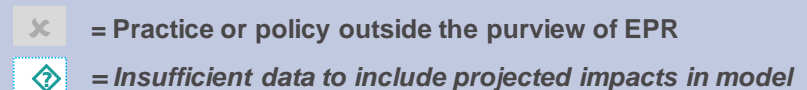
Practices Considered for Achieving Recycling Reinvented's Goals in EPR System Model Analysis



Practices included in EPR system model:



Practices not included in EPR system model:



EPR System Model Definitions and Assumptions

The following pages present definitions and assumptions related to the EPR system to be modeled for this study.

Designated Materials

Under the EPR system modeled for this study, the specific list of materials classified as consumer packaging and printed paper is based on (and constrained by) existing material categories used to classify materials in Minnesota's recycled and disposed MSW streams. All materials classified as consumer PPP are considered "designated materials" and are assumed to incur fees to finance the recycling system.

In cases where a material category contains both PPP and non-PPP materials, the percentage of that category comprising PPP has been estimated by the study team. The same is true for categories that contain both materials targeted for collection and those not collected.

Materials Targeted for Collection

It is assumed, under the EPR system modeled for this study, that a subset of designated materials are included in recycling collection programs, and that the list of materials collected for recycling is harmonized statewide.

For this study, the following criteria were used to determine the list of materials assumed to be collected under EPR in the model:

- The material is already being collected for recycling in at least some programs in the state, which can include commercial drop-off collection programs such as those for plastic bags.
- Technology exists to cost-effectively separate and process the material from commingled loads.
- There are recycling markets for the material.
- Collection of the material is expected by consumers or enhances their participation (e.g., collecting all plastic containers (#1-7) to reduce confusion, even if some types of plastic containers lack markets).

Appendix A includes the full list of the material categories that will be used in this study and associated classifications of designated and collected materials, along with sources or explanations for the classification percentages used.

EPR System Model Definitions and Assumptions

Residential Recycling Service Access

For this study, it is assumed that access to residential recycling service access is universal under the EPR system modeled, and that existing Minnesota state statute serves as a minimum convenience standard for the recycling system. Minnesota already requires that residents have the opportunity to recycle, and monthly residential collection is required in cities of 5,000 or more in the Twin Cities Metro Area and in cities of 20,000 or more statewide.

The EPR system modeled will be designed to go beyond these minimum standards, maintaining service for all residents who currently receive residential recycling collection and expanding residential curbside and multifamily collection services to, at a minimum, all cities of 5,000 residents or more. In the system modeled, residents not served by curbside or multifamily collection have access to convenient recycling drop-off locations.

Collection and Processing Infrastructure

It is assumed that, through the EPR system, the PRO will utilize and enhance existing collection infrastructure—such as collection vehicle fleets (in MN, these are primarily private-sector owned and operated under contract to local governments or via private subscription services), curbside collection containers, and drop-off facilities—providing financing and using service contract negotiations to achieve desired system changes.

This study assumes that the PRO will also provide financing and use service contract negotiations to streamline system organization, including establishing a hub-and-spoke transfer and processing network that maximizes processing infrastructure efficiency, and that the PRO will provide incentives and technical assistance to improve the quality of materials supplied to end markets.

Alternative Collection of Plastic Bags and Film

The EPR system modeled for this study is designed around residential recycling collection, but the study will also include an analysis of the use of an alternative collection of plastic bags and film.

In the system modeled, it is assumed that plastic bags and film are determined by the PRO to be unsuitable for inclusion in the residential curbside and multifamily recycling collection list. Instead, the study assumes that plastic bags are collected through a voluntary commercial drop-off collection program financed by producers. For analysis purposes, the study will include a separate module that models this as an expansion of the existing “It’s in the Bag” program operated by the Recycling Association of Minnesota.

Away-from-Home Collection of PPP

It is assumed that away-from-home collection is part of a fully implemented EPR system, used both as a mechanism for achieving increased collection of PPP and to raise public awareness about recycling. There are many examples of best practices for different types of away-from-home collection (e.g., bars/restaurants, special outdoor events, permanent indoor venues like stadiums, etc.) However, few programs have uniform cost data that can be applied to this study in a timely fashion.

Due to these data constraints, this study will look at a more limited set of examples. For example, the study will include an analysis of the expansion of the existing “Message in a Bottle” away-from-home recycling program also currently operated by the Recycling Association of Minnesota, and will assess the costs and estimated tons collected under the modeled expansion.

EPR System Model Definitions and Assumptions

Market Development

Supporting market development is assumed to be part of the PRO charter. This study will include an assessment of existing markets, gaps, and market development needs specific to Minnesota.

Directing materials to domestic manufacturing markets is assumed to be a goal in the EPR system modeled, but the study recognizes that trade agreements and protections for interstate commerce prohibit the restriction of exports.

Furthermore, it is assumed under the EPR system modeled, that producers do not assume ownership of collection and processing capital, and that producers do not own designated materials once they enter the marketplace. Accordingly, it is assumed that producers can influence end markets mainly through contract negotiation and market development.

The model will assume that all materials with available domestic markets will be directed to those markets, and the study will include a discussion of the economic tools available to PROs to incentivize domestic use of collected materials.

Recycling Targets and Calculation of Recycling Rate

The recycling rate achieved under the EPR system modeled will be driven by implementation of specific practices, and projected outcomes will be based on real-world data. The EPR system modeled will not be “designed” to meet a specific recycling target, but results from the model will help illuminate whether Recycling Reinvented’s proposed recycling target (75%) is achievable, and what the costs might be to achieve it.

Because the model will focus on residential recycling collection, the recycling rate for consumer PPP under both the current

system and the EPR system modeled will be calculated for the residential sector only.

The study will include estimates for additional tons available and projected to be collected through commercial drop-off collection for plastic bags and through away-from-home venues, but these quantities will not be integrated into the base calculations of the recycling rate.

Only materials that are collected for recycling will be included in the numerator for the calculation of the recycling rate. Materials that are diverted from landfill disposal through other means (such as composting, beneficial use, or energy recovery) will not be included as recycling in this study.

Recycling System Costs

As part of the study, recycling system costs for both the current system and the EPR system modeled will be estimated on a per-unit basis across a range of program types and outcomes, and a range of total system costs will be estimated for the EPR system modeled.

Where available, cost estimates for the EPR system modeled will be based on data on average per-unit costs for current recycling programs in Minnesota (as self-reported by jurisdictions) where the attributes of the EPR system modeled are already in place, scaled to account for increases in tons collected, residents served, and assumed processing efficiencies achieved. Additional cost estimates will be based on information about program costs from reference programs outside of the state.

Producer Financing Principles and Scenario Assumptions

This study will use the estimated costs of the EPR system modeled to develop a producer financing scenario, including examples of potential material-specific fees assessed on packaging and printed paper to finance the PPP recycling system under EPR.

Producer Obligation

In the producer financing scenario for the EPR system modeled, it is assumed that producers will finance 100% of the costs for recycling consumer PPP collected through residential collection and other collection channels designated by the PRO, such as alternative collection of plastic bags and film.

In addition, it is assumed that producers of designated materials cover (by market share) the net cost of managing any non-designated recyclable materials (e.g., general office paper) and non-recyclable residuals in the recycling stream (e.g., contaminants).

For simplicity of modeling, the model will assume all producers join a single PRO – but it is assumed that producers will not be required to join, and they may meet their obligation in some other way.

Additional Costs to be Included

The costs of enforcement will be estimated and included in producer costs, whether enforcement is to be carried out by state government or a private entity.

Additional costs will include:

- Technical assistance to improve recycling programs
- Market development
- Litter abatement and public awareness programs

For this study, it is assumed that start-up costs associated with the transition to an EPR system, such as expansion of infrastructure and one-time promotion and education to inform participants of program changes, would be financed by producers. For the EPR system modeled, it is assumed that all capital is financed over the life of equipment, and so is reflected in annualized costs of the model. However, non-capital cost items would cause slightly higher fees in the initial couple of years, after which ongoing expenditures at the same level would no longer be required. Because our intention is to compare long-term steady state costs not under EPR and under EPR, we will not include temporary start-up costs in our cost estimates.

Cost Allocation and Fee Structure

In the producer financing scenario for the EPR system modeled, all producers of consumer PPP will be assessed fees, except that small *de minimis* producers may be exempted.

There are numerous ways in which total system costs can be split among producers and the example fee rates to be calculated in this study may not represent what a producer would pay if PPP EPR were to be implemented in Minnesota, or what is paid in other jurisdictions where PPP are subject to EPR.

It is assumed that fees will be assessed based on the total amount of PPP supplied, regardless of whether the material is included in the producer-financed recycling collection system.

Additional details about how costs will be allocated to producers under the fee scenarios will be provided in the third working paper of the study.