MOVING CONSUMERS UP THE WASTE HIERARCHY WITH
THE PAINT PRODUCT STEWARDSHIP INITIATIVE'S
OREGON PILOT PROGRAM

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Abstract

To combat growing environmental and resource-related problems from leftover paint, the Paint Product Stewardship Initiative established a paint stewardship program in Oregon. Its task was to increase paint collection infrastructure, provide opportunities for reuse and recycling, and create outreach campaigns to reduce the generation of excess paint. The goal of this study was to explore the design and implementation of the Oregon program to move consumers up the waste hierarchy of reduction, reuse, recycling, energy recovery, and disposal, and to describe the program's obstacles, opportunities, and decisions with respect to the waste hierarchy. The methods of analysis included content analysis of program documents, a series of interviews with program personnel, and analysis of available program paint volume data. The results indicate that the main focus for the first year of the Oregon program was collection infrastructure for recycling (49 percent of paint collected was recycled), energy recovery (27 percent processed for energy recovery), and disposal (21 percent sent for disposal), with less emphasis on waste reduction and paint reuse (3 percent). Both existing and new infrastructure was leveraged to increase recycling, energy recovery, and disposal, and the emphasis of education and outreach materials was also on these lower tiers. To more efficiently encourage reliance on the most-preferred management methods in the waste hierarchy, the primary recommendation is for the program to articulate explicit goals related to paint volume or other indicators for each tier of the hierarchy, and then implement the specific recommendations to support these stated objectives.

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List of Abbreviations

Abbreviation	Full Text
ACA	American Coating Association
Amazon	Amazon Environmental, Inc.
ARMA	Alberta Recycling Management Authority
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ESD	Evaluation Support Division
HHW	Household hazardous waste
NPCA	National Paint and Coatings Association
PaintCare	PaintCare, Inc.
PLP	Processed Latex Pigment
PPSI	Paint Product Stewardship Initiative
Product Care	Product Care Association
PSC	Phillips Services Corporation
PSI	Product Stewardship Institute
PSO	Paint Stewardship Organization

Moving Consumers Up the Waste Hierarchy with
the Paint Product Stewardship Initiative's
Oregon Pilot Program

Chapter 1: Introduction

Each year, more than 75 million gallons of leftover paint are generated by households and contractors who purchase more paint than they need (Abt Associates, 2007). This paint becomes household hazardous waste (HHW), and when disposed of improperly can lead to a number of environmental and health-related threats. In addition to environmental and health issues, leftover paint is currently the largest component of local HHW collection programs in the U.S., forcing local entities to expend considerable resources to manage and collect unused paint; it costs an estimated $8 to manage just one gallon of leftover paint (SCS and Cascadia, 2007).

To combat the growing environmental, health, and resource-related issues caused by leftover paint, in 2003 the Product Stewardship Initiative (PSI) brought together paint manufacturers, government agencies at all levels, paint recyclers, retailers, contractors, and other stakeholders, collectively known as the Paint Product Stewardship Initiative (PPSI), to discuss options for post-consumer paint management. PSI successfully facilitated discussions culminating in an agreement in October 2007 among PPSI participants that called for the establishment of an industry-funded Paint Stewardship Organization (PSO) tasked with collecting and managing leftover paint. The agreement stated that:

- The PSO would be funded using a pass-through cost to consumers (i.e., adding a consumer fee to the purchase price of paint products)

- Demonstration Project should be conducted initially

- Thorough evaluation of the Demonstration Project would be conducted to assess program success (PPSI, 2007)

On July 23, 2009, Oregon became the first state to pass a law requiring the establishment of a product stewardship program for managing leftover oil-based and latex paints (Oregon State [Oregon], 2011a). This law grants legal permission to charge and collect a consumer fee on paint products, the prohibition of which had previously inhibited PPSI's ability to set up a PSO and conduct a Demonstration Project (PPSI, 2007). The American Coating Association (ACA), a member of the PPSI, formed PaintCare, Inc. (PaintCare) as the PSO responsible for the collection and management of post-consumer paint in Oregon. The Oregon Department of Environmental Quality (DEQ) is responsible for submitting progress reports on the pilot program, obtaining reports of performance measurements from PaintCare, and recommending changes and improvements to the pilot program (Oregon, 2011a).

The PPSI agreement included specific instructions to evaluate the pilot program in order to inform development of programs in additional states. To this end, an Evaluation Committee consisting of industry, Oregon stakeholders, U.S. Environmental Protection Agency (EPA), and rollout states (other states that signed the agreement) was formed in September 2009 to design an evaluation of the Oregon pilot program. The Committee formed 14 key evaluation questions to be answered to determine effectiveness of the program and to provide recommendations and improvements to the pilot and programs to be implemented in the rollout states.

One aspect of the Oregon program evaluation was to determine how the program was designed and implemented to move consumers up the waste hierarchy. An example of a waste hierarchy is EPA's oft-mentioned preferred hierarchy of reduce, reuse, recycle (and dispose). A waste hierarchy lists waste management methods in order of most preferred to least. The goal is to move consumers towards the top of the hierarchy, as the methods on top are the most cost-effective and environmentally preferable.

This paper answers the evaluation questions:

- How was the program designed and implemented to move consumers up the waste hierarchy?
- With respect to moving consumers up the waste hierarchy, what were the program's obstacles, opportunities, and decisions?

This information will provide insight to Oregon and other states on how to design paint stewardship programs that more efficiently encourage reliance on most preferred management options. The results will be combined with answers to the other evaluation questions to analyze all facets of the program's design and implementation. Like the pilot program, the evaluation has been a participatory endeavor relying on collaboration from industry, government, the private sector, and nonprofits. If the pilot program is successful, it will reduce the purchase of excess paint, increase demand for recycled paint, aid other states in the development of paint management programs, and further demonstrate the use of product stewardship as a successful product management model.

Chapter 2 of this paper provides background information on product stewardship initiatives and leftover paint management methods and programs. Chapter 3 discusses the methodology used to answer the evaluation questions above. Chapter 4 presents the analysis of data and findings related to the evaluation questions, and Chapter 5 discusses recommendations and areas for further research.

Chapter 2: Background

As public opinion and knowledge of environmental issues continues to steer industry to produce greener products and use more environmentally friendly processes, individual consumers and businesses are paying increasing attention to the entire life-cycle of the products they use. This includes not only the socioeconomic and environmental impacts of how a product is produced, marketed, and used, but also what happens to the product when its usefulness ends. For many products, the burden of disposal often falls on the government as consumers contribute items to the waste streams managed by local public works, and there has been a push to shift the onus instead to the people who use and the people who make these products.

As discussed in the preceding section, the 2009 Oregon law dictated a product stewardship approach for managing leftover paint. Product stewardship has become increasingly popular in discussions of waste management strategies. The Product Stewardship Institute defines the term as "a policy that ensures that all those involved in the life-cycle of a product share responsibility for reducing its health and environmental impacts, with producers bearing primary financial responsibility" (PSI, 2011). Key components of a product stewardship strategy include:

- Cost internalization
- Producer responsibility within a shared responsibility context
- Establishment of performance goals
- Program flexibility (PSI, 2011)

Stewardship has become a popular management strategy for several products that represent disposal challenges, products such as batteries, carpeting, fluorescent lights, pesticides, medical sharps, mercury-containing products (e.g., thermostats, cathode ray tubes), other electronics, gas cylinders, and phone books. It has been featured more prominently as a waste management strategy this century as people have realized its potential for sustainability and for financial advantages to municipal waste management systems. Table 1 presents PSI's estimates of the magnitude of potential financial savings from product stewardship programs for municipalities for a number of products. In particular, PSI estimates a product stewardship program for paint would save a municipality $1.97 per capita annually (PSI, 2010).

Table 1. Potential per Capita Financial Benefits to Local Governments from Product Stewardship

Product	Estimate of amount of waste per capita	Cost of management/ disposal	Annual per capita potential savings
Electronics	7.1 pounds	$0.30 / pound	$2.13
Paint	0.25 gallons	$8.00 / gallon	$1.97
Household Batteries—Primary	0.8 pounds	$1.00 / pound	$0.80
Medical Sharps	13 units	$0.05 / unit	$0.64
Fluorescent Lamps	0.4 units	$0.69 / unit	$0.28
Household Batteries—Secondary	0.24 pounds	$1.00 / pound	$0.24
Thermostats	0.03 units	$5.00 / unit	$0.15
Phone Books	4.3 lbs	$62.00 / ton	$0.13
Pesticides	0.08 lbs	$1.58 / lbs	$0.13

Source: PSI, 2010

Paint management presents a unique problem compared to other waste for a number of reasons. Although latex paint has been ruled a non-hazardous waste (EPA, 2002), a number of environmental hazards are still associated with leftover latex and oil-based paints. Latex paint contains acrylics and epoxies that can contaminate groundwater if poured down the drain or disposed of as liquid in regular trash and landfills. Oil-based (or alkyd) paint is flammable and can contain substances such as formaldehyde, benzene, and heavy metals. These present a carcinogenic health risk and can be toxic for the environment. In addition, paint is not a product that consumers deal with on a day-to-day basis. Disposal is not allowed in regular solid waste pickup or in water/sewer systems, and consumers oftentimes lack knowledge about proper disposal options.

Leftover paint has typically been managed by HHW collection programs. Latex paint is the largest volume waste collected by these programs, and because HHW programs are designed to collect and manage hazardous wastes from residents, leftover latex paint often ends up being managed as a hazardous waste. This can be extremely costly for municipalities, and with budgets declining, many cities are finding it more difficult than ever to manage leftover paint (National Paint and Coatings Association [NPCA] 2008a; ACA, 2010).

Applying product stewardship management strategies to leftover paint can provide a solution to some of the economic and environmental questions associated with this product, and some cities and regions have already established programs like these that are successful. In Canada, British Columbia passed laws requiring a paint stewardship program in 1994. Product Care Association (Product

Care) currently runs a program for the province to collect and transport leftover paint for reuse, recycling, and energy recovery. The program is funded by an "eco-fee" that is added to the price of paint, and in 2010 the program collected over 2.7 million liters of paint (Product Care, 2011).

A similar program exists in Alberta. As part of Alberta's "Too Good to Waste" initiative that began in 2007, waste paint is collected from residents and sorted to be reused, recycled into paint or other materials, or sent for proper disposal. This program is also funded by an environmental fee added to the paint sales, with proceeds going to a dedicated fund for the paint management program. The Alberta program exceeded its goals for recycling in the 2010-2011 Fiscal Year (Alberta Recycling Management Authority [ARMA], 2011).

One of the central elements of product stewardship is extended producer responsibility, which PSI describes as "a policy approach in which the producer's responsibility for their product extends to the post-consumer management of that product and its packaging" (PSI, 2011). Despite this, industry advocates often have enough clout to redistribute some of the costs associated with that responsibility to consumers and others. This redistribution can help gain industry support and cooperation for a program, and is the case in both Canadian programs mentioned above. As discussed in the previous section, the Oregon Pilot Program also includes a fee added to the purchase price of paint products that effectively transfers the cost of managing the program to consumers.

The advantages of product stewardship and the seemingly successful applications of product stewardship to leftover paint management discussed above

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have prompted other states, including Oregon, to explore options for setting up

programs. With the Pilot Program, Oregon and PSI hope to demonstrate a

successful state-wide program that can be transferred to other regions, eventually

to be adopted nationwide. Monitoring and evaluating the program's success

during this formative stage is important in order to identify opportunities, resolve

issues, and inform development of programs in other states.

Chapter 3: Methodology

This section describes the methods used to determine how the Oregon Pilot Program was designed and implemented to move consumers up the waste hierarchy. As part of this formative evaluation, intended to "influence the ongoing development" (Royce & Thyer, 1996, p. 57) and provide lessons learned from the Pilot Program, analysis of both primary and secondary data are combined to answer the question. The project consists of:

- Content analysis of relevant program documents

- Gathering of first-person data from a series of interviews

- Analysis of available program data on paint volume to evaluate how the Oregon Pilot Program was designed and implemented to move consumers up the waste hierarchy.

This triangulated approach, with the use of multiple sources of data, provides a more in-depth answer to the evaluation question than would be possible with only one data source, and also allows for internal verification of results and findings from each source against the other sources.

Content Analysis of Program Documents

A content analysis of relevant program materials was conducted to document program processes and make inferences about the relative emphasis the program placed on each tier of the waste hierarchy. Instead of observing the program in action or directly asking questions of staff and stakeholders, content analysis allows the researcher to systematically "ask" questions of the program

materials and secondary data to gather information and draw conclusions (Frankfort-Nachmias & Nachmias, 1992). In order to provide unbiased results, all program materials that are publicly available or could be obtained from program management were reviewed; no documents were specifically included or excluded. Below is a list of some of the program materials that were included in the content analysis:

- All pilot program materials publicly available on the project web site (http://paintstewardshipprogram.com/)
- Memos from the Oregon Paint Stewardship Pilot Program Evaluation Committee
- EPA Evaluation Support Division (ESD) documentation on the program, including the evaluation report
- Oregon legislation related to paint management
- PaintCare (the PSO) documents on the pilot program, including the Annual Report
- Oregon DEQ's Draft Legislative Report on the Paint Product Stewardship Law
- PPSI memos and committee documentation
- PSI report on paint product stewardship
- Materials from ACA and the National Paint and Coatings Association (NPCA) related to paint management
- Abt Associate's report on quantification and disposal of paint in the U.S.

- Other available program documents

Program materials provided background information; an understanding of the goals, processes, and functioning of the program; and a definition of the waste hierarchy used for measuring results to the evaluation question. For the content analysis, materials were reviewed in order to tease out themes related to education materials, convenience, infrastructure, and performance. Determining the frequency with which documentation related to the reduction, reuse, recycling, and disposal of leftover paint allowed for analysis of the relative emphasis the program design placed on each category of the waste hierarchy.

Interviews with Program Personnel

The primary source of data to evaluate how the Oregon Pilot Program was designed and implemented to move consumers up the waste hierarchy was gathered through a series of interviews with program management staff and stakeholders. Combined with information from program documents, the interview data provides insight into how Oregon and other states can design paint stewardship programs to more effectively result in consumers in the most preferred hierarchy categories.

An initial interview with Abby Boudouris of Oregon DEQ, who is responsible for the state's oversight of the pilot program, was completed on April 6, 2011 to gather contact information for other potential interviewees and to better understand the state's role and interest in the pilot program. Additionally, interviews with employees of PaintCare, PSI, Oregon DEQ, EPA, Metro (regional

government for the Portland metropolitan area), and the Evaluation Committee were conducted in October and November 2011. Interviews were mainly conducted by phone due to the program's geographic location (two interviews were conducted in person with interviewees who were located in Lexington, Massachusetts) and lasted between 40 and 80 minutes. These interviews were designed to solicit information on:

- Design and current processes of the program

- Interviewees' interpretation of the waste hierarchy

- Success of different aspects of the program

- Barriers to achieving program goals

- Recommendations

- Interviewees' input into categorizing program components into tiers of the waste hierarchy.

The initial interview with Ms. Boudouris, as well as the opening interviews with PaintCare and Product Stewardship Institute leadership served as input into the development of the interview guides for the subsequent interviews and helped to identify staff at the other organizations who should be interviewed. Interviews were conducted with the following individuals:

- Abby Boudouris, Oregon DEQ

- Scott Cassel, Product Stewardship Institute

- Alison Keane, PaintCare

- Matt Keene, U.S. EPA Evaluation Support Division

- Lou Nadeau, Eastern Research Group, Inc. (ERG) (in-person interview)

- Jim Quinn, Metro

- Amy Stillings, ERG (in-person interview)

- Hedrick Strickland, Duke University

- Marjaneh Zarrehparvar, PaintCare

Appendix A of this report provides a copy of the complete interview guides used in the Pilot Program personnel interviews. In addition to these interviews, this report relies on notes provided by ERG from interviews conducted with seven HHW representatives and three Oregon paint retailer representatives for the evaluation.[1] These provided insight into the program's impact on volume of paint collected at HHW sites, costs for collection sites, and retailers' involvement with program implementation.

Volume Data Analysis

Another component to determine how the program was implemented to move consumers up the waste hierarchy is to analyze data collected from the program to determine the volume of paint that can be classified into each category of the waste hierarchy. The amount of paint in each category may demonstrate which categories the program focused on during implementation, and provide

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[1] A description of these interviews is provided in section 2.4.2 of EPA's evaluation report (ERG, 2011a), with a full list of interviewees found in section 15.0. Interviews were conducted with retailers in May of 2011, followed by HHW representative interviews in June and July of 2011 by ERG staff. Although the notes from these interviews are not yet publicly available, ERG provided a written copy of the notes specifically for this report (ERG, 2011b).

details on which categories the program ended up impacting the most after implementation.

Because the program is still in its infancy at the time of this report, the amount of good data available is relatively limited. There are data available in the PaintCare Annual Report (2011a), Oregon's Draft Legislative Report (2011b), and EPA's evaluation report (ERG, 2011a) that detail the final disposition of latex and oil-based paint. The data in the three reports are identical for the most part, based on numbers provided by PaintCare. Volume data from PaintCare is sometimes provided in gallon values and sometimes as a percent of total. For this report, each final disposition was categorized into a tier of the waste hierarchy, and both gallon and percent (of category of paint, oil-based and latex, and of total paint) values are presented or calculated. A summary table of volume data is presented in the Overall Results section of Chapter 4, and the numbers are further discussed in the findings sections related to specific tiers of the hierarchy.

Chapter 4: Findings and Analysis

This chapter begins with a discussion and definition of the waste hierarchy model used to evaluate the Oregon program. A presentation of the overall results follows, including a matrix that categorizes program components into tiers of the waste hierarchy and provides information on related obstacles, opportunities, decisions, and relative program emphasis. Five subsections follow the overall results, each pertaining to a tier of the hierarchy that discuss more in-depth findings for that individual level.

Waste Hierarchy

To answer the question, "How was the program designed and implemented to move consumers up the waste hierarchy?" the first step was to define the appropriate waste hierarchy model the Oregon program was intended to be measured against. Goal 3 of the PPSI Work Plan for the demonstration project was to have consumers generate less or no waste paint and containers, i.e., to reduce post-consumer paint generation by changing consumer purchase behavior. Another separate goal (Goal 4) was to have a leftover paint management system that would "strive to use methods highest on the following waste management hierarchy:

- Reuse

- Recycling (into paint or other products)

- Energy recovery (generally applicable to oil-based paint)

- Proper disposal" (PPSI, 2009)

Combining these two goals creates a five-tiered waste hierarchy the program was originally scoped to emphasize:

- Reduce (the generation of waste paint)

- Reuse

- Recycling (into paint or other products)

- Energy recovery (generally applicable to oil-based paint)

- Proper disposal

Another hierarchy important to consider is Oregon DEQ's own Solid Waste Hierarchy, based on the Recycling Opportunity Act of 1983 and revised by the 1991 Recycling Act (Oregon, 2003):
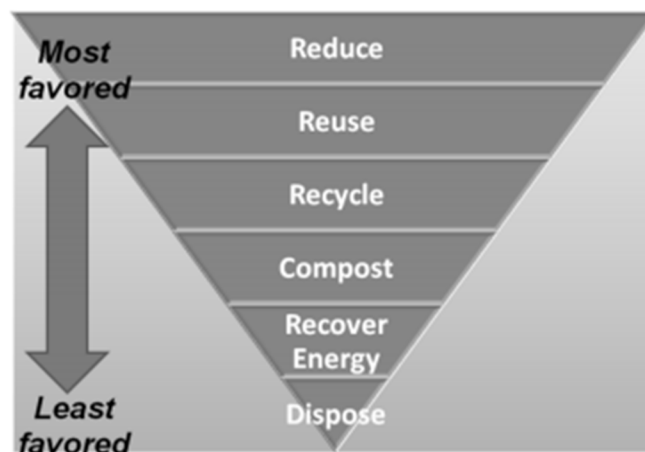
Figure 1. Oregon's Solid Waste Hierarchy (Allaway & Spendelow, 2011)

This hierarchy is based on extensive research and life-cycle analyses by Oregon DEQ and others to ensure it correctly categorizes environmental impacts of management options. The hierarchy is used as policy guidance, not as absolute law that all programs must adhere to. In particular, if a different hierarchy for a specific material results in lower environmental impacts, Oregon DEQ supports that deviation from the accepted hierarchy shown above (Allaway & Spendelow,

2011). In this case, "compost" does not apply for paint products, and the resulting hierarchy is equivalent to the one defined in the PPSI Work Plan (PPSI, 2009).

Because the demonstration project was originally planned for Minnesota, the Minnesota waste hierarchy may have played a part in determining the measuring stick for the program that debuted in Oregon. The Minnesota Waste Management Act (Minnesota State [Minnesota], 2011) includes a list of waste management practices in order of preference:

- Reduction and reuse

- Recycling

- Composting

- Resource Recovery

- Disposal

Although reduction and reuse are combined in this model, it is almost identical to Oregon's preferred hierarchy. Because the hierarchy gleaned from the PPSI Work Plan goals matches up with these statutorily-defined hierarchies, which are based on accepted research and constructed after data were collected, the five-tiered hierarchy presented above (Reduce; Reuse; Recycling; Energy recovery; Proper disposal) is used to evaluate the Oregon program. During interviews with program management, interviewees were asked about the appropriateness of using this hierarchy or if they thought the evaluation question referred to a different hierarchy. All interviewees felt the evaluation should be based on this five-tiered hierarchy.

Overall Results

This section presents a characterization of how paint collected by the program flows into each tier of the waste management hierarchy (Figure 2. Oregon Pilot Program Paint Flow and Final Disposition by Waste Hierarchy Management Method), a categorization of volumes of paint collected by final disposition (Table 2. Disposition of Paint by Waste Hierarchy Management Method), and finally a matrix that summarizes and compiles findings related to how the program was designed and implemented to move consumers up the waste hierarchy (Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category). Detailed findings are discussed in the sections for individual hierarchy tiers that follow below.

Overall, the findings point to a program emphasis on collections and infrastructure to support recycling, energy recovery, and disposal. Existing infrastructure in Oregon has supported this, as have partnerships made and contracts executed by the program. Goals to reduce the generation of leftover paint and to provide opportunities and information about reuse and exchange do not appear to be a top priority during the first year of the program. In addition to infrastructure, most education and outreach materials highlight collections supporting the three lower tiers of the hierarchy as opposed to reduction and reuse options. The volume of paint collected by the program corroborates the findings above: 49 percent of paint collected was recycled; 27 percent was processed for

energy recovery; 21 percent was sent for proper disposal; and 3 percent was reused.[2]

As discussed above, an indicator of program emphasis and success related to management of paint based on the hierarchy can be inferred from the amount of paint that ended up in each tier of the hierarchy. Figure 2 below presents a condensed graphic of the flow of paint in the program and how it ends up in each tier of the hierarchy. The figure is ordered the same way standard waste management hierarchy graphics are, with methods most preferred at the top and least preferred at the bottom. Each white terminal represents a final disposition for paint in the Oregon program, and includes the percent of overall paint collected that ended here. "Reduce" is not included in the figure because technically the flow of paint cannot be represented as this category of the tier involves reducing or removing the paint that needs to be managed by the program. This is by no means an indication of the importance of waste reduction for the program; it is simply an artifact of being unable to display this concept graphically.

The methods represented by each white terminal in Figure 2 are discussed in the subsections for specific hierarchy tiers following this section, but a summary explanation of each is presented below:

- *Paint reuse.* Good paint in containers that are at least half full is offered to consumers for reuse. Some oil-based paint collected by Metro is reused, and a number of ReStores (stores that sell donated construction materials) that participate in the program offer latex paint to consumers for reuse. See the Reuse section below for more details.

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[2] Reliable data on the amount of leftover paint reduced is unavailable at this time.

- *Metro brand recycled paint.* Some latex paint collected by the program is recycled into MetroPaint brand recycled paint and resold to consumers. See the Recycling section below for more details.

- *Amazon Environmental, Inc. (Amazon) brand recycled paint.* Some latex paint collected by the program is recycled into Amazon brand recycled paint and resold to consumers. See the Recycling section below for more details.

- *Amazon recycles into Processed Latex Pigment (PLP).* Some latex paint collected by the program is reprocessed by Amazon into PLP, which is used as a raw material in the manufacture of cement. See the Recycling section below for more details.

- *Oil-based paint to Phillips Service Corporation (PSC) for fuel-blending.* All oil-based paint that is unable to be reused is sent by PSC to licensed hazardous waste facilities for fuel blending energy recovery. See the Energy Recovery section below for more details.

- *Amazon energy recovery PWP.* Some latex paint collected by the program is used by Amazon to make PWP, a biomass fuel made using waste paint as a binder for sawdust and other materials that can be used as a fuel source. See the Energy Recovery section below for more details.

- *Paint sent to landfill.* Some latex paint collected by the program is sent to Columbia Ridge Landfill in Arlington, Oregon, for proper disposal. See the Proper Disposal section below for more details.
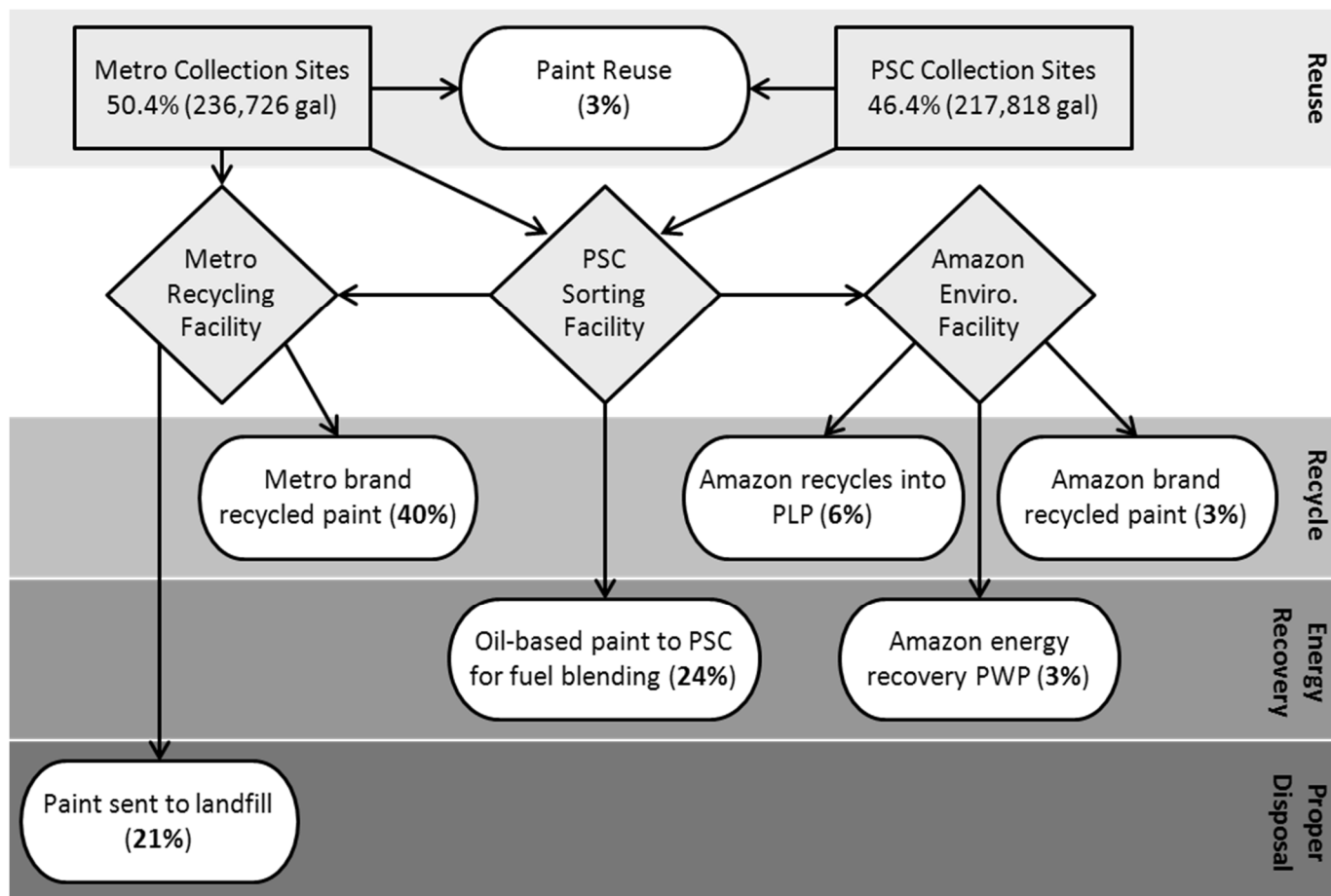
Figure 2. Oregon Pilot Program Paint Flow and Final Disposition by Waste Hierarchy Management Method

The percentages included in Figure 2 are derived from analysis of percentage and gallon volume data provided by PaintCare. Table 2 presents the disposition of paint by waste hierarchy management method, and is broken down by paint type (latex and oil-based). Table 2 indicates that almost half (49 percent)

Table 2. Disposition of Paint by Waste Hierarchy Management Method

Paint and Disposition Category	Total Gallons [a]	Percent of Total Paint Collected in Category[b]	Percent of Total Paint Collected
Latex paint			
Reuse			
Consumer reuse	10,564	3%	2%
Recycling/Reprocessing			
Metro recycling	186,632	53%	40%
Amazon recycling	14,085	4%	3%
Amazon PLP	28,171	8%	6%
Energy recovery			
Amazon biomass (PWP)	14,085	4%	3%
Disposal			
Metro biodegradation (landfill)	98,598	28%	21%
Total latex paint	352,136 [c]	100%	75%
Oil-based paint			
Reuse			
Consumer reuse	3,526	3%	1%
Energy recovery			
Amazon fuel blending	114,003	97%	24%
Total oil-based paint	117,529	100%	25%
Total paint			
Reuse	14,090	-	3%
Recycling/Reprocessing	228,888	-	49%
Energy recovery	128,088	-	27%
Disposal	98,598	-	21%
Total	469,665	-	100%

Source: PaintCare, 2011a; ERG, 2011a; DEQ, 2011a

[a] Values are calculated by multiplying the total paint in category by the reported percentage in the third column. Numbers may not add to reported gallons due to rounding. In particular, PaintCare reported that 15,122 gallons of paint was managed through reuse (PaintCare, 2011) compared with a value of 14,090 here.

[b]For latex this is the percentage of total latex paint collected (352,136 gallons) and for oil-based is the percentage of oil-based paint collected (117,529 gallons).

[c] Values do not add to total due to rounding

of the paint collected was recycled, over one quarter (27 percent) of paint was processed for energy recovery, 21 percent of paint was transferred for disposal, and just 3 percent of paint was reused during the first year of the program. As mentioned above, data on the effect the program had on reducing the generation of waste paint in its first year are not readily available.

In addition to results of volume of paint in each tier of the waste hierarchy, Table 3 below summarizes the findings related to how the program was designed and implemented to move consumers up the waste hierarchy. The Table 3 matrix categorizes program components based on their contribution to each tier in the hierarchy, and lists information compiled on decisions, obstacles, opportunities, and relative emphasis for each tier. Program components considered were determined based on the program's interactive logic model (Keene, 2011), other program documents, and interviews, and include:

- Collections (retailers, HHW sites, and events)
- Transportation
- Infrastructure
- Education and outreach
- Assessment fee
- Exchange at ReStores and the reuse incentive
- Reprocessing as paint
- Reprocessing as non-paint
- Market for recycled paint
- Energy recovery

- Disposal

The performance, convenience, related educational materials and infrastructure, and decisions during design and implementation made concerning each component were considered and compared to determine the relative emphasis the program puts on each tier of the hierarchy. Barriers to achieving objectives and opportunities for improvement related to the components in each tier were also assessed.

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Reduce (the generation of waste paint)	Retailers (in the capacity of selling paint to consumers)	• Provide point-of-sale materials to retailers • Provide training to retailers with regard to the program • Visits to retailers to gauge progress	• Reduction runs counter to profit goals of retailers • Messaging of "reduce" may imply buying paint is "bad" and hurt retailers • No incentive for retailers to discourage purchase of paint	Increase training and work with retailers to determine best messaging and mutually-beneficial language	Overall relative emphasis by retailers on reduction appears low
	Education and outreach	• Program plan includes campaign to emphasize the purchase of the correct amount of paint • Promotion of the Paint Calculator	• Low level of knowledge and use of the Paint Calculator • Consumer behavior takes time to change • Low level of information dissemination from retailers	• Increase point-of-sale materials emphasizing reduction in waste generation • Increase educational materials on how to stow paint properly so it can be used for job intended • Implement recommendations from prior projects, including in-store kiosks to assist consumers in purchasing the correct amount of paint • Work on partnerships with retailers (retailers interact the most with consumers)	• Survey shows that 93 percent of respondents indicated that the program had no effect or influence on the amount of paint they purchased or planned to purchase (PaintCare, 2011) • With the exception of the Paint Calculator, there are no good examples of education and outreach materials emphasizing reduce • Overall relative emphasis of education and outreach materials on reduction was high in design phase; appears low in implementation
	Assessment fee	• The Legislation states that producers will remit a fee per container to the stewardship organization, equal to an amount sufficient to recover, but not exceed, the cost of the program • Assessment fee for year 1 is between $0.35 and $1.60 depending on container size • Assessment fee was added to the purchase price of paints, paid by consumers • Collected at point of retail, not at point of collection of post-consumer paint	• Forecasting program costs and paint sales to accurately set assessment fee amount • Non-compliance • Not allowed to describe fee as a recycling fee • Awareness of the fee is low	Charging a fee may Increase consumer awareness of program	• Education and outreach materials emphasized the assessment fee • Overall relative emphasis of the assessment fee on waste reduction appears low

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category *(cont.)*

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Reuse	ReStores	Partnered with ReStores to act as collection sites and offer paint exchange	Limited/no partnership with Habitat for Humanity and other organizations	Consider developing more partnerships with a spectrum of organizations	• Major emphasis of ReStores is reusing paint, and if not possible, then on recycling of paint • Only 10 ReStores active as collection sites in the program; overall relative emphasis of ReStores on reuse appears low
	Retailers: Collections	Program did not invite retailers to act as paint exchange location	• Liability of retailers for unknown materials • Space and storage issues • Branding issues • Consumer demand	• Determine how to mitigate liabilities for retailers • Educate consumers about reducing contamination in paint they return	Retailers not acting as paint exchange sites; relative emphasis of retailers on reuse appears low
	HHW: Collections / Events: Collections	Few HHW and Events offer Paint Exchange shelves	• Space and storage issues • Consumer demand	Increase consumer awareness through education and outreach	Small amount of exchange at HHW collection sites and events. Only 3 percent of collected paint was reused; relative emphasis of collections on reuse appears low
	Infrastructure	Metro provides small amount of reuse for oil-based paint	Infrastructure that covers the state is difficult without retailer locations offering exchange	Increase number of locations offering reuse and exchange (see other components)	As above, 10 ReStores and small amount of reuse at Metro collection sites; relative emphasis of infrastructure on reuse appears low
	Transportation	There is no transportation component for reuse; exchange is offered where paint is dropped off	• Transportation is one-way: once paint is transported to a sorting facility, it cannot return to where a consumer could reuse it • Consumer awareness and getting good paint to people where and when they want it	Determine feasibility of back-hauling in the transportation system	Paint is not transported for reuse: relative emphasis of transportation on reuse appears low
	Education and outreach	• No program materials designed specifically to emphasize reuse • A number of materials talk about reason for program being to "manage the reuse, recycling, and proper disposal of old paint"	None	Increase point of sale materials and information available on reuse (why it is beneficial, where to do it, how to get involved)	Although no specific materials pertain to reuse, many mention reuse and emphasize reuse as option for consumers; relative emphasis of education and outreach on reuse appears medium
	Reuse incentive	Program offers a $0.25 per gallon reuse incentive to entities for paint exchange	• Incentive is extremely low • Paperwork required to receive the incentive is more trouble than it is worth	• Raise incentive; current amount is less than 1/20 of the amount it costs program to manage paint in lower tiers • Offer incentive to broader base	• No one took advantage of the reuse incentive in year 1 of the program • Incentive is designed specifically to promote reuse (high emphasis on reuse) • Overall relative emphasis the incentive has on reuse appears low

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category *(cont.)*

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Recycling (into paint or non-paint products)	Retailers: Collections	• Program encourages retailers to act as collection sites where consumers can bring and drop off accepted program materials • 70 retailers in collection system as of Sept. 1, 2011	Collection site operators may not have adequate training on acceptable program materials or sorting procedures	More training and continue with compliance visits	Program emphasis on recruiting retailers as collectors; relative emphasis on retailers collections appears very high
	HHW: Collections	• Program works with existing HHW collection sites and encourages additional HHW facilities to serve as collection sites • 18 HHW and solid waste sites in collection system as of Sept. 1, 2011	HHW collection sites are not compensated for their efforts; no incentive to act as a collection site	• Determine feasibility of supporting HHW collection sites • Continue to increase partnerships with HHW programs	Collections are number one priority for program; relative emphasis on HHW collections appears high
	Events: Collections	• PSO participated in current HHW collection events and held addition paint-only collection events in areas without permanent collection locations • Participated in 57 HHW collection events and 2 PSO-sponsored events	Surge in leftover paint brought in from professional painters and non-program materials	Continue sponsorship of events where collection sites are limited	Collections at events provide stopgap for areas with no permanent collection sites; relative emphasis on events collections appears high
	Infrastructure	• Program pledges to provide collection locations across the states • Goal to establish a collection site within a 15 mile radius of 97.21% of the population • Increase the business hours for collection sites to provide good service level to consumers • Tap into current collection infrastructure, establish retail collection and hold events where permanent collection locations cannot be established	• Collection site redundancy • Lack of potential sites in remote areas	• Continue with plans to recruit permanent collection sites • Majority of paint is collected at HHW sites, as opposed to retailer sites; consider redistribution of program focus among HHW sites, retailers, and other options	Main goal of program to provide collection locations across state and increase convenience of a paint management system; relative emphasis of infrastructure for recycling appears very high

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category *(cont.)*

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Recycling (into paint or non-paint products) *(cont.)*	Transportation	• Program contracts with PSC to provide transportation from collection sites to sorting facilities and to processing facilities • Containers are placed at collection sites and when half full, site can schedule a pick-up • Program provides large volume direct service to residents with over 200 gallons of paint • Program contracts with Metro to provide transportation from Metro sites to the Metro sorting facility	• Transportation is one-way: once paint is transported to a sorting or processing facility, it cannot be re-transported or back-hauled to a different facility • Location of processors (distance to processing facilities is far, sometimes out-of-state) • Component affected by costs and environmental impact of transportation	Consider way to increase transportation options with regard to paint sorted for disposal (i.e., re-transportation to other facilities that could still process rejected paint)	Transportation tied directly to infrastructure needs; overall relative emphasis on collections infrastructure (currently providing most support for recycling) and transportation is high
	Education and outreach	• Almost all program materials emphasize collections (where, how, why) that contribute to increased recycling • Fact Sheets, drop-off site handouts, collection site posters, and the 1-800 number educate consumers on where to bring their paint for recycling	Promoting recycling can have unintended effect of making consumers feel *too* comfortable with recycling and cause an increase in the amount of leftover paint generated	Continue efforts to educate consumers about the program and collections	Education and outreach campaign emphasize collections and how consumers can get paint into the system for recycling; relative emphasis of education and outreach on recycling appears high
	Reprocessing as paint	• Program contracts with Metro to reprocess collected latex paint into recycled MetroPaint • Program contracts with Amazon to reprocess some latex paint sent to facility into recycled Amazon Select paint	• Contamination of collected paint • If all best paint is slated for reuse, no good quality paint for raw material in recycled paint	Potential restructuring of contracts with paint recyclers to require higher recycling rates	Two contractors recycle paint and the majority of collected paint for the program is recycled; relative emphasis on reprocessing as paint appears high
	Reprocessing as non-paint	Program contracts with Amazon to reprocess latex paint into PLP, a raw material used in manufacture of cement	Limited opportunities across the country for reprocessing as non-paint; program only works with one contractor for this	• Research other options for reprocessing into non-paint products • Increase paint volume transported to Amazon for reprocessing	8 percent of collected paint is reprocessed into PLP by Amazon; relative emphasis on reprocessing as non-paint materials appears medium
	Market for recycled paint	Program does not attempt to promote or increase the consumer market for recycled paint	• Consumer awareness of recycled paint • Paint jobs typically color-specific: consumer demand may be low for many colors able to be produced from recycled materials	• Consider promotional materials for recycled paint if legally feasible • Continue research for alternative markets (e.g. exporting to international markets where demand is higher)	Program is not involved with markets or demand for recycled or reprocessed materials; relative program emphasis on this component appears low

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category *(cont.)*

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Energy recovery (for oil-based paint)	Retailers: Collections	Same as Recycling; see above	Same as Recycling; see above	Same as Recycling; see above	Same as Recycling; see above
	HHW: Collections				
	Events: Collections				
	Infrastructure	Same as Recycling; see above	• Same as Recycling; see above • Almost all energy recovery is from oil-based paint (not latex); facilities must be permitted to handle oil-based paint in order to become part of program infrastructure	Same as Recycling; see above	Same as Recycling; see above
	Transportation	Same as Recycling; see above	Same as Recycling; see above	Same as Recycling; see above	Same as Recycling; see above
	Education and outreach	• Almost all program materials emphasize collections (where, how, why) that contribute to increased energy recovery • Fact Sheets, drop-off site handouts, collection site posters, and the 1-800 number educate consumers on where to bring their paint	Amount of oil-based paint purchased is shrinking ergo need for energy recovery from program materials is too; may not need to focus program education and outreach on energy recovery	Same as Recycling; see above	Same as Recycling; see above
	Energy recovery	• Program contracts with PSC to bring oil-based paint to state-approved facility for fuel blending • Program contracts with Amazon to make PWP, a biomass fuel product, from latex paint that cannot be recycled into paint or PLP	Cost of transporting more paint to Amazon facility capable of energy recovery from latex paint	Redirect latex paint being sent for disposal to facilities capable of energy recovery (Amazon)	Energy recovery is necessary for management of oil-based paint and systems already in place prior to program; relative program emphasis on energy recovery appears medium

Table 3. Matrix of Decisions, Obstacles, Opportunities, and Relative Emphasis of Program Components by Waste Hierarchy Category *(cont.)*

Waste Hierarchy Category	Program Component	Decisions Made	Obstacles	Opportunities	Relative Emphasis
Proper disposal	Retailers: Collections HHW: Collections Events: Collections Infrastructure Transportation	Same as Recycling/Energy recovery; see above	Same as Recycling/Energy recovery; see above	Same as Recycling/Energy recovery; see above	Same as Recycling/Energy recovery; see above
	Education and outreach	• Almost all program materials emphasize collections (where, how, why) that contribute to increased energy recovery • Retailer and Trade Painter fact sheets discuss assessment fee funding "collection, transportation, recycling, and proper disposal" of paint in OR	None	Same as Recycling/Energy recovery; see above	Same as Recycling/Energy recovery; see above
	Disposal	Program contracts with Metro; paint not suitable for Metro recycling is sent to Columbia Ridge Landfill for biodegradation	None	• Continue to research and evaluate different methods of disposal • Consider redistribution of volume of paint sent to contractors to reduce paint being sent for disposal • Continue emphasizing collections to move paint currently being disposed of improperly into the system	Program materials often discuss proper disposal, and 1/5 of paint collected in year 1 were sent for disposal; relative program emphasis appears medium

<u>Reduce</u>

Goal 3 of the PPSI Work Plan (2009) is to have consumers generate less or no waste paint and containers. To that end, one of the key elements included in the Oregon PaintCare program listed in the Pilot Program Plan (PaintCare, 2010a) is outreach and education, with an objective of emphasizing the purchase of the correct amount of paint to prevent waste. Paint in this tier effectively never enters the pool of paint that needs to be managed, and this reduction in waste generated is the most-preferred method of management environmentally and economically for governments or others charged with managing leftover paint.

Interviewees involved in the conceptual stages noted that reduction was a main focus in the Work Plan produced by PPSI (2009) for a program of this type (which was written before the passing of the Oregon legislation and therefore before the design of the actual program as implemented), followed by reuse, recycling, and disposal. Some interviewees indicated this was carried over into design of the Oregon program, and that PaintCare's first and foremost concern or mantra is still waste minimization and getting consumers to buy the right amount of paint.

Despite this intention in design, there is little to no evidence that consumers reduced their waste paint generation and interviewees think the program is struggling with waste minimization goals. Because this tier represents the non-existence of leftover paint, there is not a lot of data to show how much paint went into this tier in the first year of the program. In the future, data on paint sales can be compared to sales in prior years, but at this point it is too early to

make inferences of causation. PaintCare did, however, conduct an online survey in July 2011 to gather information on waste minimization from Oregon residents who purchased paint during the first year of the program. The survey shows that 93 percent of respondents indicated that the program had no effect or influence on the amount of paint they purchased or planned to purchase (PaintCare, 2011a). This was true when referring to the program education and outreach materials and to the assessment fee the consumer pays to fund the program. ERG points out, however, that this survey does not cover consumers who may have chosen not to buy paint because of the program (ERG, 2011a).

Although survey results indicate progress has not been made on reduction, most interviewees feel it is too soon since program inception to realize large gains in this area because it involves behavior change, which takes time. In addition to slow behavior change, another reason reduction goals may not have been met is that many of the statutory requirements for PaintCare to achieve in the first year concerned collections as opposed to reduction or reuse. Setting up infrastructure and systems for collections quickly eases the burden and cost to local governments and HHW programs, so this was a priority for the program in the first year (PaintCare, 2011a). This also helps the program gain local support and be more attractive to HHW programs to partner with, which allows the program to be more effective in the future (e.g. by providing more collection sites and offering more outlets for information). Most interviewees feel that now that the program is up and running, with infrastructure for collections in place, there will be more opportunity to focus on reduction and reuse goals.

Interviewees from PaintCare said that about 50 percent of educational point-of-sale materials highlighted waste minimization as opposed to where consumers should bring paint for collection. Materials available online and in the Annual Report appendices (PaintCare, 2011a), however, show just two materials that focus on purchasing the correct amount of paint to minimize leftover. The Paint Calculator Poster provides a graphic designed to aid consumers in purchasing the correct amount of paint for their projects. The poster indicates there are monetary, environmental, and space-saving benefits to purchasing the right amount of paint, and focuses solely on the reduction tier of the hierarchy (PaintCare, n.d.a). In addition, the PaintCare website provides an online version of the Paint Calculator that presents the same information. A link to a more detailed paint calculator is also provided (PaintCare, 2010b).

Not only are there fewer education materials related to reduction than to other messages, analyses also indicate these materials were not effective. The survey showed that just 18 percent of respondents recalled seeing the Paint Calculator, and only 20 percent of those actually
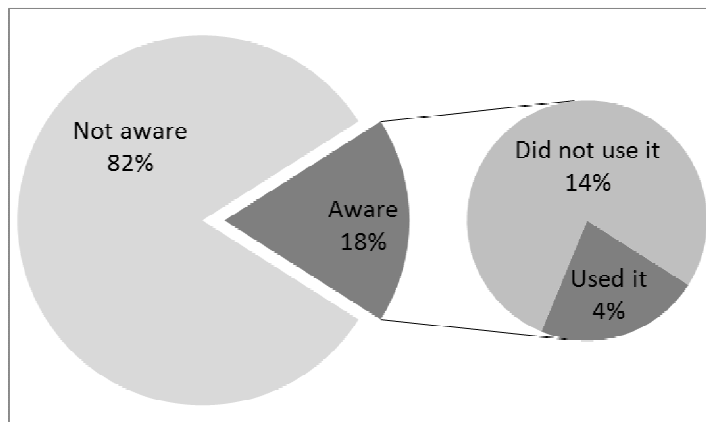
Figure 3. Awareness and Use of Paint Calculator (ERG, 2011a)

used it (less than four percent of respondents overall) (See Figure 3) (PaintCare, 2011a; ERG, 2011a). Interviewees said that when PaintCare management visited

sites, these materials were hard to find and not necessarily being displayed as planned, and this lack of use at the retail level, coupled with lack of materials available overall, inhibits the influence of the outreach program.

A number of barriers exist to achieving the goal of having consumers generate less (let alone no) waste paint. Interviewees felt the biggest barrier to waste reduction is consumer behavior. This is not in reference to the fact that people do not want to do the right thing (interviewees all felt people were interested in being environmentally responsible), but that it is inherently difficult to purchase the exact amount of paint needed. Currently, one cannot purchase a continuous amount of paint; rather it is sold in discrete amounts. If a paint job is going to require more than one gallon (but less than two), a consumer must buy two whole gallons and end up with leftover paint. [3] Even the Paint Calculator is drawn in blocks, demonstrating the non-continuous nature of purchasing paint
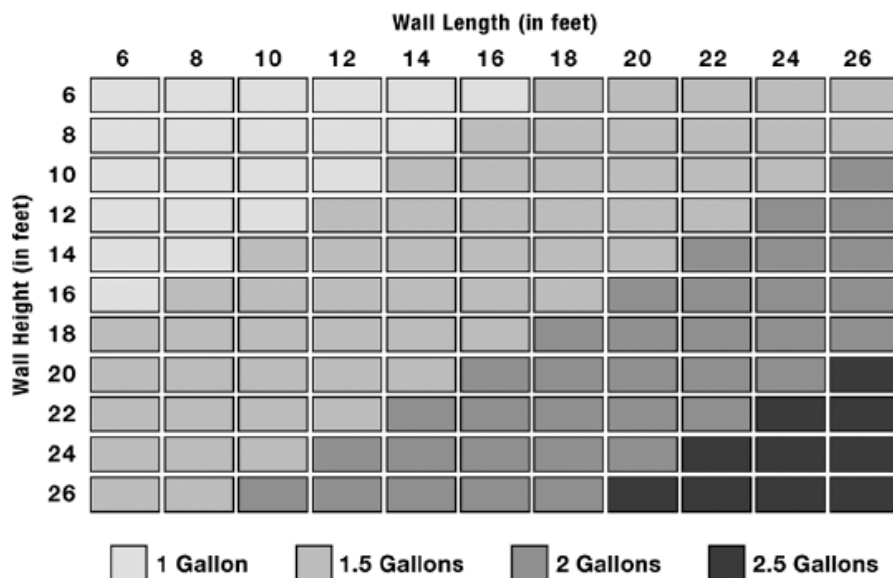
Figure 4. PaintCare's Paint Calculator (PaintCare, 2010b)

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[3] Paint is sold in smaller containers than a gallon; this is used as an example to demonstrate the difficulty in purchasing an exact amount of paint.

(see Figure 4 above). This limits the opportunity for a person to achieve a goal of zero leftover paint.

Another example of consumer behavior affecting waste is that many people purchase paint for a specific job, and most of the time, it is a very color-specific job. If purchasers end up not liking the color, more often than not they will simply go out and buy more paint of a different color, because cost is not prohibitive.

Besides consumer behavior, interviewees thought a major institutional barrier to waste reduction is that this management method runs counter to the goals of people who sell paint. Industry's long term goals include having consumers purchase paint, and this goal requires the promotion of the opposite. In addition to paint sale reduction's eating into profits directly, industry may not want people to get the feeling that buying paint is "bad," which is certainly a message that could be received from promoting the idea of 'reduce.' It is not surprising that some interviewees feel retailers are not doing a good job of getting PaintCare information out to the consumer when there is no incentive (and maybe even disincentive) to do so. Because of this, one interviewee suggested it may be more productive to change the messaging for this tier. Commercial marketing campaigns are historically more effective than traditional educational campaigns (leading to the recent increase of Social Marketing campaigns, where techniques customarily used for commercial marketing are used to promote social change or ideas), so if the goal of the program to reduce waste paint generation can be aligned with industry goals (e.g. of increasing profits), the combination of

marketing techniques implemented by the private sector with current education and outreach campaigns spearheaded by the government and nonprofit organizations will likely have more success in expediting purchasing behavior change than one technique alone.

An advantage for increasing movement to this tier compared to lower ones is that if the program successfully moves consumers here, not only will that reduce overall management costs and environmental impacts, but it does not require any adjustment or additions to the program infrastructure to accommodate that change. Moving consumers into this tier therefore mostly involves improvements in education and outreach. One opportunity to reduce leftover paint is to promote the idea that if a consumer buys paint for a specific project and has leftover, she can always use that leftover paint for another project. In this way, consumers can use up more or all of the paint they purchase, thereby reducing the amount of waste paint that needs to be managed by the program.

In addition, a component on educating consumers on how to store paint properly so it can be used in the future (see Figure 5) could be added to the Program. In the original talks for the program in Minnesota, there

2 STORE PAINT PROPERLY TO KEEP IT FRESH

If your project is complete and you still have a fair amount of paint leftover, be sure to correctly store the paint. Proper paint storage will eliminate safety concerns and keep your paint fresh for touch-ups or future projects. For best results, cover the opening of the paint can with plastic wrap and securely seal the lid. When you are sure the lid is leak-proof, turn the can upside down and store it in a place with a moderate room temperature to avoid freezing. Be sure to choose a safe location that is out of the reach of children and pets.

Figure 5. Point 2 of ACA's "5-Point " Program (ACA, n.d.)

was an emphasis on this, since Minnesotans have an issue with paint freezing and being unusable. Combating this problem was a focus of the program (PSI, 2004). The climate in Oregon is more temperate, however, and freezing paint is not a main concern, so the program lost a focus on emphasizing proper paint storage procedures to consumers. Proper storage could increase the longevity of stored paint, however, allowing consumers to use more of it instead of needing to dispose of it.

Research conducted before the pilot began can also provide opportunity for reducing waste generation. In 2005, PSI was involved with a project on source reduction to identify reasons consumers overbuy paint, and to develop recommendations on education and other strategies that could be implemented to change purchasing behaviors and reduce leftover paint generation. One of the recommendations from that project was to use in-store kiosks where a consumer could go to determine the correct amount of paint they needed without having to measure before arriving at the store, and without having to see a store clerk (McKenzie-Mohr & Associates, 2005). This was not implemented in the first year of the program, but could be an opportunity in the future to further reduce the generation of waste paint (Cassel, 2007).

Finally, the majority of interviewees felt there is an opportunity for the program to work more closely with retailers to affect consumer purchasing behavior. Consumers only buy paint once every few years, so contact about the program and about minimizing waste needs to occur at the point-of-sale or else it may not be relevant enough to consumers to internalize. Since this interaction

occurs at the retailer level, the program needs to ensure retailers are not only

disseminating information and are trained to educate the consumers, but also that

it is the right information and that it is being made available to consumers in the

best way. Because retailers are the people who are interacting with the consumer,

they need to be able to provide the best recommendations for what works and

what does not.

Reuse

Reuse of paint (Figure 6) is second on the hierarchy of preferred management strategies but does not appear to be a main focus for the program during the first year. Besides reducing the overall amount

Metro Collection Sites 50.4% (236,726 gal)

Paint Reuse (3%)

PSC Collection Sites 46.4% (217,818 gal)

Metro Recycling Facility

PSC Sorting Facility

Amazon Enviro. Facility

Metro brand recycled paint (40%)

Amazon recycles into PLP (6%)

Amazon brand recycled paint (3%)

Oil-based paint to PSC for fuel blending (24%)

Amazon energy recovery PWP (3%)

Paint sent to landfill (21%)

Figure 6. Paint Reuse

of waste generated, reusing material as it was originally intended is the

environmentally preferable option, as it requires no reprocessing and minimal

transportation (if offered where it is returned). In addition, reuse of paint has the

lowest management costs of any other options for leftover paint (Oregon, 2011b).

PaintCare has contracted with Metro and a number of ReStores to offer

paint available for reuse. As of September 1, 2011, ten ReStores act as collection

sites for the program. Good paint in containers that are at least half full is offered
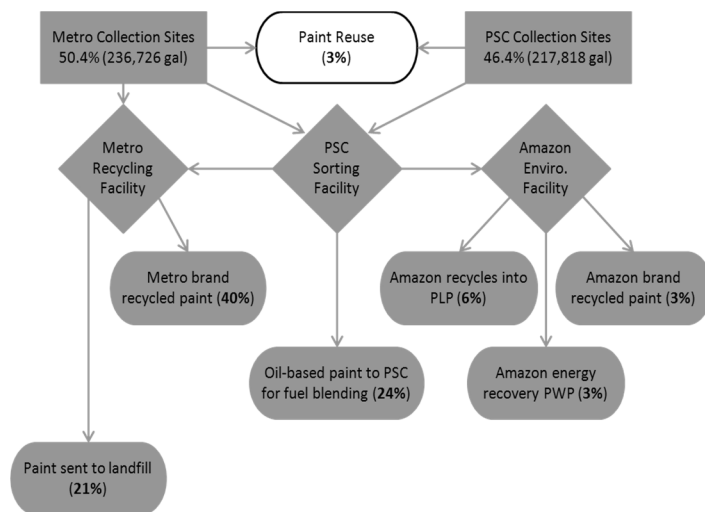
to consumers for free or for a reduced price (PaintCare, 2011a). Some HHW sites also offer their own paint exchange tables where residents can leave or take paint to reuse.

Between July 2010 and June 2011, just 3 percent, or 15,122 gallons, of both latex and oil-based paint collected by the program were reused (PaintCare, 2011a; Oregon, 2011b). Interviewees felt this percentage was low and that it could be a lot higher. Not all paint is a good candidate for reuse (or recycling for that matter), however, which is something to keep in mind when comparing volumes of paint in each tier of the hierarchy The program promotes reuse of paint by offering an incentive of $0.25 per "reuse" gallon designed to reflect the savings associated with transportation and processing. However, as indicated in PaintCare's Annual Report (2011a), no participants took advantage of this incentive during the first year of the program. Although no sites collected the incentive offered by PaintCare, sites already offering reuse do consider reuse an important service and did not indicate plans to stop offering it (ERG, 2011a).

No program educational materials specifically emphasize reuse of paint. A number of materials, however, focus on getting consumers to bring paint to collection sites, where it can then be sent for reuse (although currently most collected paint gets recycled or disposed of). These include, among other materials, the Counter Cards, the Product and Fees link online, the Collection Site poster, and Drop-off Site Handouts. These all include copy that the program has been established to "manage the reuse, recycling, and proper disposal of old paint." (PaintCare, 2010a; 2010c; 2010d; 2010e). The PaintCare tagline on most

materials also includes the word "Reuse." However, none of these materials emphasize reuse nor provide enough details to effectively communicate that reuse is a preferred management method for the program.

Infrastructure for reuse is limited, in part because PaintCare did not recruit retailers to act as reuse sites due to what interviewees referred to as "liability" for retailers who may wish to offer reused paint. Since the source of the reused paint to be sold may be unknown, a retailer cannot guarantee what is in a can and if it is safe. Retailers are responsible for the products they sell, and so there may be unknown legal and product quality liabilities for retailers who offer reused paint. Support for this concern is mentioned in a 2008 report by the National Paint and Coatings Association (NPCA, 2008b), which found that paint can be contaminated with components such as pesticides, used oil, and other harmful chemicals by virtue of being stored in similar places as these other hazardous wastes (e.g., in a garage or basement). Table 4 lists contaminates that might be found in collected paint indicated by the 2008 study. In addition to affecting

Table 4. Contaminates that Might be Found in Post-Consumer Paint

Description	Chemicals in Contents
Rust Stain Remover	Hydrofluoric acid and sodium sulfite
Bathroom Cleanser	Tetrasodium ethylene diamine tetracetate, plus organic ammonium and chloride complexes
Reducing Solvent	Ethylene glycol monoethyl ether acetate
Gypsy Moth Spray	Carbaryl (1-naphthyl, N-methylcarbamate)
Crab Gras and Dandelion Killer	Dodecyl ammonium methanearsenate, Octyl ammonium arsenate and octyammonium salt of 2-4 Dichlorophenoxy acetic acid
Gasoline Antifreeze	Methyl alcohol
Sudsy Detergent	Ammonium hydroxide
Weed Killer	Diethylamine salt/ 2-4, dichlorophynoxy acetic acid and Diethylamine salt of 2-(2 methyl) 4-chlorophynoxyl propionic acid

Source: NPCA, 2008b

reuse, paint may be too contaminated for use as a raw material in recycling processes as well.

A guidance manual for paint reuse programs published by the National Paint and Coatings Association (NPCA, 2008c) also talks about space and storage concerns for retailers, HHW programs, and other sites that could offer reuse. Integration of an exchange area into a facility's layout, accessibility and safety for consumers entering the area, and having enough room and staff on hand are all potential barriers to facilities participating as exchange sites. Facilities would also potentially need permits and/or verification of site acceptability to manage and store rejected or non-program materials that consumers bring in for exchange (NPCA, 2008c). Figure 7 presents some additional safety and health and liability factors mentioned in the guidance manual (NPCA, 2008c).

The convenience of paint exchange and reuse also seems to be lower than for recycling or disposal. According to interviewees, exchange is happening mainly at the ReStores. The convenience of ReStores is lower than for other collection

Factors to Consider When Organizing a Reuse Program:

✓ Safety and Health
- Ventilation
- Protective Clothing
- Paint Identification Protocol
- Traffic Control

✓ Liability
- Emergency Contacts
- Spill Plans
- Waiver Forms
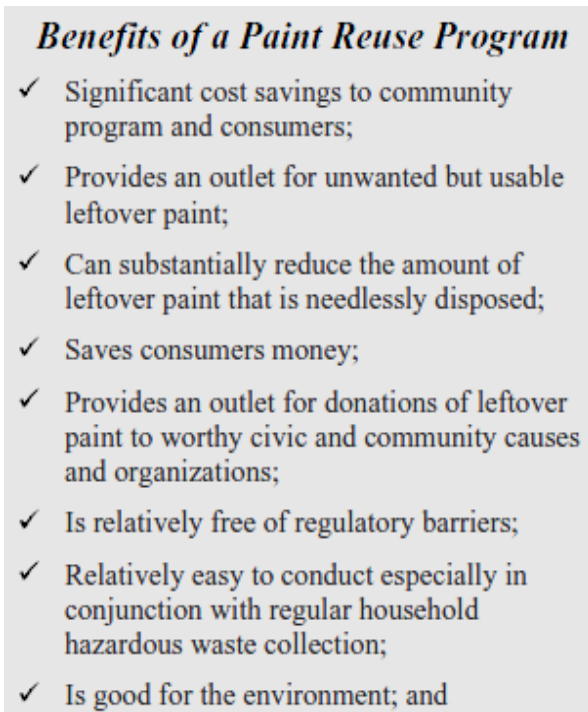- Product Storage

✓ Contractual Agreements
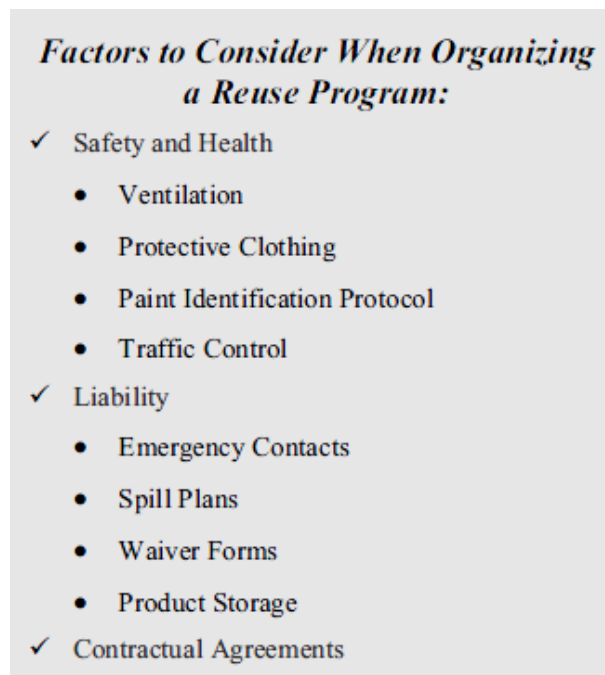
Figure 7. Reuse Considerations (NPCA, 2008c)

sites because there are fewer locations and fewer instances where a consumer would be traveling to a ReStore for reasons besides paint drop-off.

A program barrier PaintCare has created for reuse occurs in the transportation component. As it functions now, the transportation component is one-way: once paint is transported for recycling, it cannot go back the other direction (i.e., to a reuse site) even if it is deemed good quality. An opportunity to move more paint into higher tiers exists here if the program can adapt to transport or back-haul such paint to a ReStore, HHW site, or other site that offers reuse.

Benefits of a Paint Reuse Program

✓ Significant cost savings to community program and consumers;

✓ Provides an outlet for unwanted but usable leftover paint;

✓ Can substantially reduce the amount of leftover paint that is needlessly disposed;

✓ Saves consumers money;

✓ Provides an outlet for donations of leftover paint to worthy civic and community causes and organizations;

✓ Is relatively free of regulatory barriers;

✓ Relatively easy to conduct especially in conjunction with regular household hazardous waste collection;

✓ Is good for the environment; and

Figure 8. Benefits of Reuse (NPCA, 2008c)

Interviewees felt another barrier to exchange (at ReStores) and reuse in general is consumer awareness. Consumers cannot take advantage of exchange unless they know about exchange opportunities and the benefits of reuse (see Figure 8). In addition, the paint needs to be sorted and available to people where they want it and when they want it. In particular, it needs to be close enough to consumers that they are not offsetting the environmental benefits of reusing paint with the harms of driving across the state.

Despite barriers and a lower percentage of paint being reused (or maybe because of it), there are many opportunities to increase reuse. Interviewees believe there exists a major opportunity to take advantage of cost savings related to the $0.25 reuse incentive, which represents a fraction of the cost to manage paint in lower tiers. According to Oregon DEQ (Oregon, 2011b), that $0.25 per gallon is 20 times less than the per-gallon cost to manage leftover paint in lower tiers (averaging $5.13 per gallon). It would make economic sense for PaintCare to raise the incentive all the way to $5.12 per gallon, but it is likely that more locations would take advantage of the incentive even if it was much smaller. In addition, interviewees mention the $0.25 incentive was not offered to Habitat for Humanity. Although it cannot be evaluated without first offering the incentive, that organization may be one of the most likely outlets to take advantage of this type of monetary incentive for reuse.

Increasing the number of locations that offer reuse adds infrastructure and convenience to facilitate more reuse. Mitigating liabilities for retailers and asking them to participate as reuse sites, partnering with additional organizations like Habitat for Humanity, and raising the reuse incentive can all contribute to opportunities for reuse. An increase in education and outreach materials directed at reuse would also help increase consumer awareness surrounding reuse of paint.

Recycling

Recycling materials into paint or other products is the third most-preferred method of management on the waste hierarchy for program products (Figure 9). Oil-based paint cannot be recycled, but good
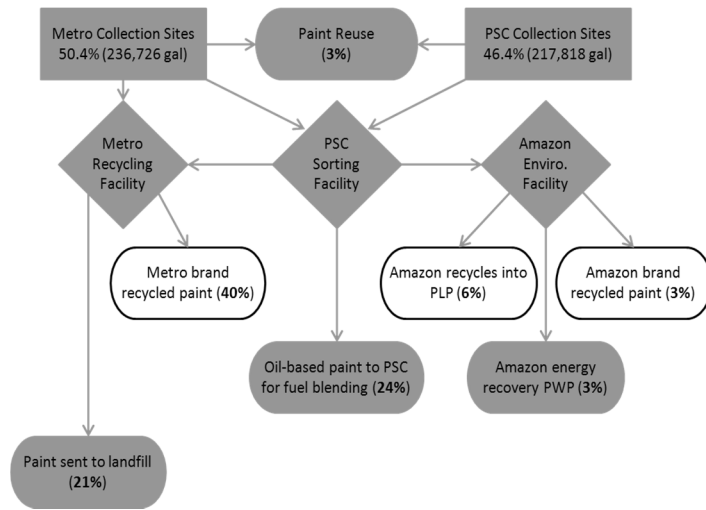
Figure 9. Recycling

quality latex paint can be combined, filtered, and processed into saleable paint. There are also a number of options for reprocessing paint into non-paint products. The amount of paint capable of being recycled is affected by the type and condition of returned paint, current options available for recycling and reprocessing paint, the capacity of recycling/reprocessing facilities, and the market for recycled paint (PaintCare, 2010a).

PaintCare has contracted with Metro and Amazon to provide recycling options for leftover paint collected under the program. Metro collects paint from the Portland metropolitan area and since 1992 has processed over 1.5 million gallons of latex paint into MetroPaint brand recycled paint resold to consumers (MetroPaint, 2011).[4] Under the pilot program, Metro also accepts paint from PaintCare collection sites outside of Portland for the same reprocessing.[5] Paint

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[4] Paint Metro is unable to process is sent for landfill disposal. This is discussed below in the Disposal section.
[5] PSC is the contractor who transports and sorts paint from non-Metro collection sites (GSU, 2011).

collected outside of Metro sites is also sent to Amazon in California for recycling into paint and reprocessing into PLP, which is used as a raw material in the manufacture of cement products[6] (Amazon, 2010).

In the first year of the program, almost half of the paint collected was recycled by Metro and Amazon into paint products or PLP. This includes 53 percent of latex paint that was recycled by Metro, 4 percent recycled into paint and 8 percent reprocessed into PLP by Amazon (PaintCare, 2011a). The Program has successfully taken advantage of existing Metro infrastructure to facilitate recycling, and Metro has increased its processing capacity from 280,000 gallons per year to more than 325,000 gallons per year of recycled paint products to accommodate processing of the increased amount of paint collected from non-Metro sites (Bledsoe, Graves, & Roman, 2011). Based on volume of paint in this tier, the program has focused on recycling in the first year and the results have been positive.

Interviewees also said the performance of the program with regard to recycling is positive. After the planning/conceptual stage of the program, the design and implementation have focused heavily on getting the recycling and collections infrastructure in place. Interviewees felt that while the program had placeholders for the other methods (specifically reduction and reuse), there was not much focus on these and efforts were concentrated on recycling. Table 5 shows the collections infrastructure, counties served, and population served before and after program inception. Most interviewees indicated that this is not an

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[6] Paint Amazon is unable to process into recycled paint or PLP is used to make PWP, a biomass fuel product. This is discussed below in the Energy Recovery section.

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unreasonable strategy for the first year of a waste management program, but that this focus will need to change in the future to reach goals related to the waste hierarchy.

Table 5. Summary of Collections Infrastructure and Coverage as of September 1, 2011

Collection Site or Coverage	Pre-Program (date unknown)	Current Program	Change
Collection sites and events			
HHW and solid waste sites	11	18	+7
Retailers	3	70	+67
ReStores	[a]	10	-
PaintCare sponsored events	0	2	+2
Local HHW events	39[b]	57	+18
Counties with any type of service [c]	19	34	+15
Percent of OR population covered [d]	69%	96%	27%

Source: PaintCare, 2011a; PaintCare, 2010a
[a] Number unavailable.
[b] Does not include 30 HHW collection events sponsored by Metro in the Portland area and 3 sponsored by DEQ.
[c] Includes service by HHW and solid waste facilities, events, or retailer/other collection sites.
[d] Refers to the percent of OR residents living in incorporated cities, towns, and Census Designated Places who are within a 15 mile radius of a collection site.

According to interviewees, most stakeholders (e.g. HHW programs, Metro, paint recyclers) have an interest in increased recycling of paint, and with this type of participant support, it is not surprising that recycling was a major focus for the program. As mentioned above, many of the statutory requirements are related to collections that support recycling, and because some infrastructure for recycling was already in place, concentrating program resources on recycling allowed the program to collect more paint than before so that positive results from the program could be easily seen by stakeholders. This type of visibility is important for pilot programs to demonstrate their worth.

In addition to good infrastructure in place for recycling, many of the

program's educational materials promoted recycling as an option of management. Almost all materials emphasize collections, and as the majority of paint collected is recycled, it follows transitively that the materials emphasize recycling. In addition to the materials discussed in the section above that focus on getting consumers to bring paint to collection sites (the Counter Cards, Product and Fees link online, Collection Site poster, and Drop-off Site Handouts), the Retailer and Trade Painter Fact Sheets and the Retailer Rack Card focus on recycling and energy recovery. Both fact sheets discuss that the PaintCare Recovery fee will fund the "collection, transportation, recycling and proper disposal" of paint in Oregon (PaintCare, n.d.b; n.d.c). The PaintCare Annual Report (PaintCare, 2011a) indicates over 1,400 and 2,414 fact sheets were mailed to retailers and trade painters respectively. The Retailer Rack Card is also designed to provide consumers with information about the program and emphasizes that the program is designed to make it easy for consumers to recycle leftover paint (PaintCare, 2011a).

One problem interviewees mentioned with focusing so much of the education and outreach resources on promoting collections is the unintended effect of making consumers more comfortable with producing waste paint because they now know they can have it disposed of properly instead of storing it in their garage or basement. In this way, having a robust collections system that consumers know can handle their leftover paint may in fact increase the amount of paint that needs to be managed, which would result in the opposite of the program's supposed goal of reducing leftover paint generation.

While the focus of the program design and implementation has been recycling and the majority of paint in the program is recycled, there are some barriers to moving paint managed lower on the hierarchy into the recycling tier. The barrier mentioned most in interviews is the same barrier discussed in the previous section, that the transportation component is currently one-way. Much of the paint that Metro does not want (because it cannot sell) could still be used by Amazon and recycled into a non-paint product. This is not happening due to the cost of transporting the paint a second time. One could argue that since 100 percent of paint sent to Amazon is recycled or processed for energy recovery, all program paint should be sent there instead of Metro. Interviewees stated that part of the reason for not doing this is that the program wanted to remain more local, both to support the local economy and because transporting farther is more costly (Amazon is located in California while Metro is in Portland, Oregon). It is also not clear whether the benefits of moving all paint out of disposal would be more or less than the harm caused by increasing the distance the program hauls paint.

Another barrier to increasing collections, and thereby recycling, is that HHW collection sites are not compensated for their efforts so may have no incentive to act as collection sites. Based on numbers extrapolated from data provided in the PaintCare Annual Report (PaintCare, 2011a), Table 6 shows that HHW sites collected the largest volume of paint per location during the first year of the program. DEQ indicated that all HHW sites that are collecting paint for the program were already collecting paint prior to the program as well (some of them were not collecting latex paint before the program but are now). Two sites,

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however, are no longer collecting paint since the inception of the program. They bowed out, leaving collection to retailers, because they were not going to receive payment for collecting: now that the program is in place, they do not need to collect themselves because that is what the program is designed for. In other words, someone else is getting money to collect and manage the paint (PaintCare, from the fee charged), so the HHW program now does not see the reason it should use its own resources to collect paint anymore. Some HHW interviewees agreed, indicating the places where collection is occurring (namely, HHW sites) should be paid for their efforts (ERG, 2011b).

Table 6. Volume of Paint Collected by Facility Type through June 30, 2011

Collection Facility Type	Count	Total Volume Collected (in gallons)	Average Volume Collected per Site
HHW and solid waste sites	15	46,367	3,091
Retailers	72	134,010	1,861
ReStores	9	18,180	2,020
Other sites	2	135	68
Total	98	198,692	2,027

Source: PaintCare, 2011b
Note: PaintCare's values were not broken out by facility type. See Appendix B for complete volume data by location and facility type. Additionally, count and volume data may not add up to numbers presented earlier due to different date range and source of PaintCare volume data.

While the majority of paint in the program is recycled, there are still additional opportunities to increase recycling. As discussed above, Metro recycles the paint they know they can sell and the rest ends up in the disposal tier of the hierarchy. The amount recycled is in part based on requirements set forth in Metro's contract, and PaintCare can potentially renegotiate to meet different goals. PaintCare interviewees mentioned an example of how Metro was achieving about a 45 or 50 percent recycling rate which was not high enough, and PaintCare

worked with them to get the rate higher. PaintCare has also put some other recyclers in touch with Metro so Metro has more outlets and capacity to recycle more paint. Interviewees expect that the recycling rate will increase over time.

An opportunity for increasing the convenience and availability of collection sites for all residents lies in the fact that there is a lot of redundancy in site location. A report by Hedrick Strickland (2010) found that while there are almost 100 collection sites serving 90 percent of the population, only about a fifth of those sites are actually needed to ensure a similar percent of the population is within 15 miles of a collection site. If consumers' perceptions of convenience are not hyper-sensitive to distance to a collection site, the additional 4/5 of the sites do not necessarily add value to the program's convenience and infrastructure. Resources could be redistributed to provide underserved areas (such as Gilliam County, where less than 3 percent of the population is within 15 miles of a collection facility) with collection sites instead of adding sites in areas already served by another facility (Strickland, 2010).

Energy Recovery

If paint cannot be
reused or recycled, the next
best option is to process it
for energy recovery (Figure
10). Oil-based paint is
considered a hazardous
waste, so energy recovery
represents the final
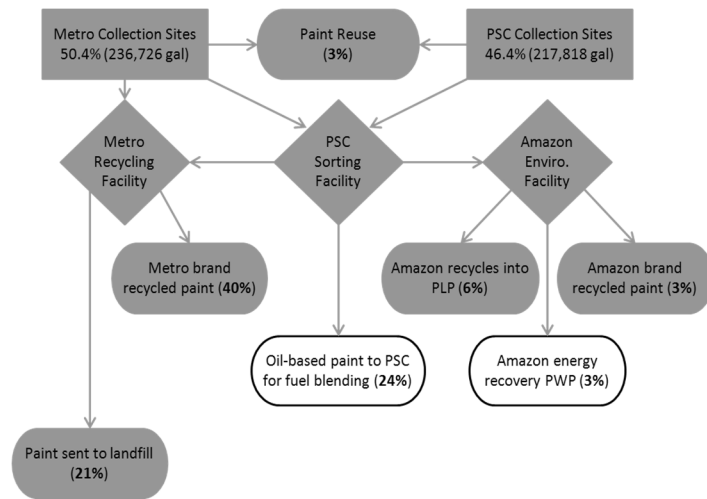
Figure 10. Energy Recovery

management option for that paint. Under the current program, all oil-based paint

that is unable to be reused is sent by PSC for fuel blending energy recovery to

licensed facilities for management of hazardous waste. For recovery of energy

from latex paint, Amazon produces PWP, a biomass fuel made using waste paint

as a binder for sawdust and other materials that can be used as a fuel source

(PaintCare, 2011a). PWP is made from latex paint sent to Amazon that cannot be

used to make recycled paint or PLP.

Year one results indicate that almost all oil-based paint (97 percent) was

sent for energy recovery, and an additional 4 percent of latex paint was processed

into biomass fuel (PaintCare, 2011a). This amounts to a little more than a quarter

of the total volume of paint collected. Energy recovery is the only end-use for oil-

based paint which cannot be reused and interviewees involved in program design

indicate it was included as a management method specifically for oil-based paint

and is a necessary part of the program. While 25 percent of the paint collected by

the program is oil-based, Table 7 shows that oil-based paint makes up on average 14.4 percent of the quantity of total architectural paint manufacturing shipments in the U.S. each year. This indicates that much of the paint being collected by the program is paint people have owned for a long time as opposed to paint purchased recently (PaintCare, 2011a). As the stock of oil-based paint stored in consumers' homes continues to decrease, the amount of oil-based paint needing to be managed, as well as the resources expended on education, outreach, and other program components aimed at consumers that focus on energy recovery, will also decrease.

Table 7. Quantity and Percent of Oil- based Paint Shipments by Year

Year	Total architectural coatings	Total Solvent (oil)- based paint	Oil-based as a percent of total
2008	674,136	100,239	14.90%
2009	634,874	88,179	13.90%
2010	643,900	93,571	14.50%
Average	650,970	93,996	14.43%

Source: U.S. Census Bureau Current Industrial Reports for Paint and Allied Products, 2008, 2009, and 2010

Because oil-based paints are a hazardous waste and were previously being managed by the state, infrastructure was already in place for facilitating energy recovery, and no changes were needed (besides contracting with PSC to support transportation). For latex paint, interviewees indicate that Amazon's ability to avoid sending any paint for disposal is a great asset for the program, and suggest exploration of other options for paint that cannot be recycled.

No program educational materials reviewed mention energy recovery as a management method. While no materials appear to focus only on energy recovery

or even use the term 'energy recovery', materials emphasize collections, where consumers can bring leftover paint and why, which is related to energy recovery. See the Recycling section above for a list of program materials that provide information on collections.

Since this is effectively the lowest tier of the management hierarchy for oil-based paint, there is no opportunity to move paint up to this tier from a lower one. As mentioned above, as oil-based paint sales taper off and the reservoir of paint stowed in residents' homes dwindles over time, the volume of oil-based paint in this tier will go down.
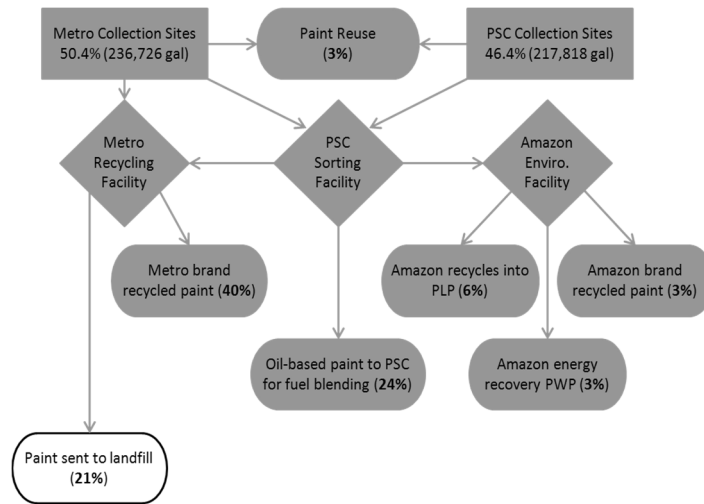
Since Amazon is the only contractor in the current program that can process latex paint for energy recovery, the only way to move more latex paint into energy recovery is by transporting more of the collected paint to Amazon. For some interviewees, there is a question as to why paint ends up at the Metro facility to be recycled, versus at Amazon for processing into recycled materials or processed for energy recovery, versus being sent to the landfill. This seems to indicate an issue in the transparency of decision-making around the sorting process of the paint. By making this more clear and calculating the costs (economic and environmental) of disposing of paint or getting it to Amazon, the program can shift the amounts of paint ending in this tier. Interviewees also suggested looking into partnership with other recycling/reprocessing companies that have additional energy recovery capability.

Proper Disposal

Disposal is the
final management method
in the waste hierarchy and
here refers to proper
disposal of paint in a
landfill or other method
approved for the program
when it cannot be reused,

Figure 11. Proper Disposal

recycled, or used for energy recovery (Figure 11). Under the Oregon program,

any paint that Metro does not recycle back into paint is sent to the Columbia

Ridge Landfill in Arlington, Oregon. Latex paint is disposed of in an experimental

landfill using a biodegradation approach that mixes the paint with wastewater

before injecting it into the landfill to improve and speed up degradation

(PaintCare, 2011a).

For the first year of the program, 21 percent of all collected paint ended up

in the landfill in Arlington (28 percent of latex paint collected, or about 35 percent

of paint collected by or sent to Metro). No oil-based paint was sent for landfill (it

is managed separately as a hazardous waste, as discussed in the Energy Recovery

section above), and no paint processed by Amazon ended up in the disposal tier

either (Amazon recycles or recovers energy from 100 percent of the paint it

receives) (PaintCare, 2011a).

As with recycling, no program educational materials appear to focus only on proper disposal, but rather materials emphasize collections, where consumers can bring leftover paint and why. See the Recycling section above for a list of program materials that mention proper disposal and recycling.

According to some interviewees, disposal is the cheapest option economically speaking, so without legislation requiring a program to do otherwise, all the waste would end up in the landfill. This will be a barrier for other states trying to put together a similar program without legislation in place specifically requiring management up a hierarchy.

As discussed in previous sections, all the paint is not transferred directly down to Amazon because of transportation cost considerations. If the program finds, however, that the amount of paint Metro sends for disposal is too high to achieve program goals, PaintCare has the option to adjust the amount of paint sent to Metro versus the paint sent to Amazon, or another contractor in the future. Metro is under contract to PaintCare with regard to the paint brought from the sorting center and PaintCare is footing the bill for the recycling, so the PSO does indeed have the power to make this type of decision and effect change. Interviewees suggest that a closer look at the way paint is being sorted could more efficiently distribute paint among the tiers of the hierarchy.

Because this is the least preferred management method, the goal for movement is technically to get all the paint currently into this tier into higher ones. Another goal can be to move paint being *improperly* disposed of up and into this tier. Interviewees have found little evidence of improper disposal, which is

supported by results of a residential paint survey that indicate respondents were not likely to put paint in the garbage or pour it down the drain (see Figure 12), but feel an opportunity exists for getting paint interred and forgotten in consumers' homes into the system. For this paint, a consumer really has only two options: the owner can improperly dispose of liquid paint in the trash or down the drain, or bring it to a collection site.[7] In this sense, by emphasizing collections and how consumers can drop off their paint, the program can conceivably move
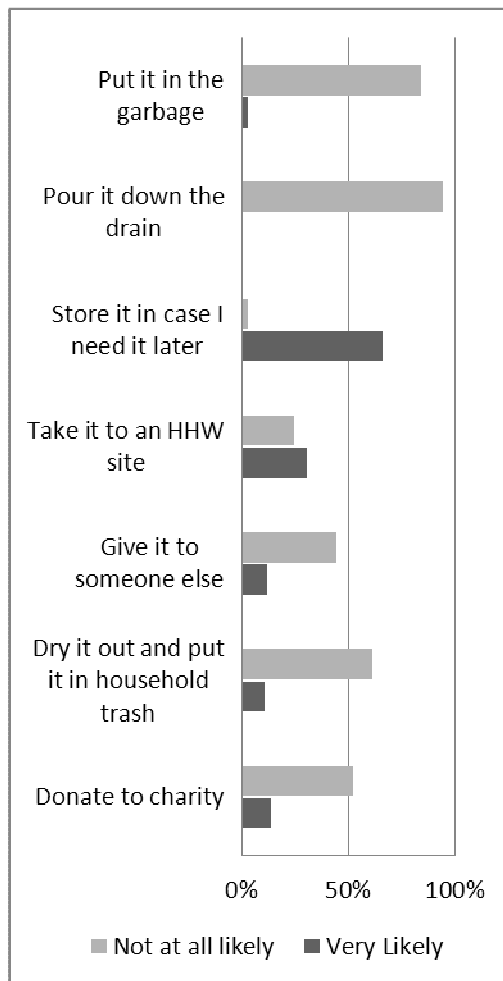
**Figure 12. Leftover Paint Activities
(McKenzie-Mohr & Asociates, 2005)**

consumers who may have planned on throwing out the paint already in their home up the hierarchy by having them instead drop it off. From here, the paint could be reused, recycled, sent for energy recovery, or lastly, be properly disposed of in Arlington.

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[7] At this point, the consumer can also *properly* dispose of small amounts of latex paint by drying it out and throwing away the hardened paint in regular trash (and the can may be recycled where recycling is available). Drying paint can pose a health risk, particularly to children and pets, and is not an option at all for oil-based paint.

Chapter 5: Recommendations and Conclusions

The interviews, content analysis of program documents, and distribution of available volume data indicate that the main focus for the first year of the Oregon pilot program was collection infrastructure for recycling, energy recovery, and disposal, while much less emphasis was placed on waste reduction and leftover paint reuse. The data show that 49 percent of paint collected was recycled; 27 percent was processed for energy recovery; 21 percent was sent for proper disposal; and 3 percent was reused.[8] Further, most education and outreach materials highlight collections supporting the three lower tiers, and both existing as well as new infrastructure was leveraged to increase recycling, energy recovery, and disposal.

Despite findings that the program did not successfully move consumers up the waste hierarchy during implementation, it is clear the original intent during program conceptualization and design was to do just that. The Oregon paint stewardship legislation explicitly requires that the program design include strategies to reduce the generation of post-consumer paint and promote reuse, and program planning documents, in particular the PPSI Work Plan (2009), list moving consumers up the waste hierarchy as a goal. Another goal detailed in the Work Plan (2009) was to measure and evaluate the performance of the pilot program. Because evaluation was expressed as a main objective, the evaluation questions themselves have played a major part in the design of the program. Mr. Keene, an evaluation expert at U.S. EPA's Evaluation Support Division, stated,

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[8] Reliable data on the amount of leftover paint reduced is unavailable at this time.

"Based on my experience in other evaluations, I believe that as you make people more and more aware of how they are going to be assessed in their performance, it shapes more and more their effort, planning, design, and ongoing work." (M. Keene, interview, October 24, 2011)

Remnants of managing up the waste hierarchy are included throughout program design simply by virtue of including an evaluation question related to the hierarchy concept.

A major obstacle to implementing the program to move consumers up the waste hierarchy lies in the fact that the program is composed of individual players, both from the private and public sector, who make their own decisions based on their own internal objectives. Those objectives may or may not be aligned with the program's objective of moving consumers up the hierarchy. In this case, the public preference in the waste hierarchy model is for reduction and reuse, whereas other participants might have had different goals. While there were opportunities to stress both reduction and reuse under this program, the program as implemented tended to focus most on collection and recycling. To ensure alignment with existing program and policy goals and reduce the potential for confusion amongst consumers and participants, the Oregon program, and other state programs to follow, should clearly articulate program priorities with regard to management up the waste hierarchy. Goals for reduction, reuse, recycling, energy recovery, and disposal should be listed either in legislation or in approved program plans.

Oregon's Draft Legislative Report (2011b) also states the need to articulate these goals. One of the draft recommendations for the program is that goals consistent with the Oregon statutory waste management hierarchy (see

Figure 1 in Chapter 4) should be set either in statute or in the program plan approved by Oregon DEQ. These goals should prioritize reducing the generation of leftover paint as well as reusing more leftover paint. Requiring the program to set specific goals in advance will provide a structure to prioritize education and outreach strategies, messaging, and where resources should be expended (Oregon, 2011b). In addition, ERG (2011a) recommends that the program should explicitly document the relative emphasis that should be placed on the different methods in the waste management hierarchy, again including prioritization of reduction and reuse of leftover paint.

In addition to stating goals with respect to management of paint in each tier of the hierarchy, the following are recommendations aimed at improving movement up the waste hierarchy for the Oregon program. These recommendations should also be treated as lessons learned to be incorporated into future programs in other states.

Reduction-Specific

- Implement recommendations from prior projects, including in-store kiosks, to assist consumers in purchasing the correct amount of paint.

Reuse Incentive

- Raise incentive; current amount is less than 1/20 of the amount it costs program to manage paint in lower tiers. Conduct analysis to determine most effective value of incentive.

- Offer incentives to a broader base (i.e., reduce eligibility requirements or offer incentive to any organization in the state, such as Habitat for Humanity).

Education and Outreach

- Increase the amount of point-of-sale materials emphasizing reduction in waste generation.

- Increase educational materials on how to store paint properly so it can be used for the job it was originally intended.

- Educate consumers about reducing contamination in paint they return.

- Increase the amount of point-of-sale materials and information available on reuse (e.g., why it is beneficial, where to do it, how to get involved).

- Consider promotional materials for the purchase of recycled paint if legally feasible.

Partnerships

- Reduce leftover paint by improving the accuracy of paint purchases, work on partnerships with retailers (retailers interact the most with consumers), including additional staff training.

- Improve and grow partnerships to increase number of locations offering reuse and exchange.

- Determine how to mitigate reuse and exchange liabilities for retailers and other locations.

- Continue to improve and grow partnerships with HHW programs to increase collection and exchange opportunities.

Transportation

- Determine the feasibility of back-hauling in the transportation system.

- Consider potential restructuring of contracts with paint recyclers to require higher recycling rates.

- Increase the volume of paint transported to Amazon for reprocessing.

- Redirect latex paint being sent for disposal from Metro facility to facilities capable of energy recovery (e.g., Amazon).

- Consider a redistribution of volume of paint sent to contractors to reduce paint being sent for disposal.

Continual Improvement

- Continue to research available options for reprocessing into non-paint products.

- Continue research for alternative markets for recycled paint (e.g., exporting to international markets where demand is higher).

- Continue to research and evaluate different methods of disposal.

The goal of this evaluation was to determine how the Oregon program was designed and implemented to move consumers up the waste hierarchy, and to describe the program's obstacles, opportunities, and decisions with respect to the waste hierarchy. Results from the interviews, content analysis, and data analysis combined have shown that in the first year, the program emphasized collections

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and infrastructure to support recycling, energy recovery, and disposal, and that goals to reduce the generation of leftover paint and to provide opportunities and information about reuse and exchange were not prioritized and can be improved in the future.

The results and recommendations of this analysis should be used to inform the ongoing development of the Oregon program and the design of paint stewardship programs in rollout states to more efficiently encourage reliance on most-preferred management options in the waste hierarchy. This evaluation of the Oregon pilot program, combined with answers to the other questions in the overarching evaluation, will help shape the Oregon pilot into an exemplary program that successfully reduces the purchase of excess paint, increases demand for reused and recycled paint, manages all waste paint state-wide, and demonstrates the use of product stewardship as a paint management model.

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Interviews

Boudouris, A. Household Hazardous Waste Coordinator, Oregon Department of Environmental Quality. Phone Interview. Conducted April 6, 2011.

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Nadeau, L, Senior Economist, Eastern Research Group, Inc. In-person Interview. Conducted October 25, 2011.

Quinn, J, Hazardous Waste Program Manager, Metro. Phone Interview. Conducted November 7, 2011.

Stillings, A, Program Evaluation Scientist, Eastern Research Group, Inc. In-person Interview. Conducted October 25, 2011.

Strickland, H, Duke University. Phone Interview. Conducted October 28, 2011.

Zarrehparvar, M, Executive Director, PaintCare. Phone Interview. Conducted October 26, 2011.

Appendix A:
Interview Guides

Interview Guide 1: Program Personnel

This interview guide was used for interviews with:

- Abby Boudouris, Oregon DEQ
- Scott Cassel, Product Stewardship Institute
- Alison Keane and Marjaneh Zarrehparvar, PaintCare
- Matt Keene, U.S. EPA Evaluation Support Division
- Lou Nadeau and Amy Stillings, ERG (in-person interview)

Interview Guide for Oregon Pilot Program Personnel

This interview relates to Evaluation Question 9: How was the program designed and implemented to move consumers up the waste hierarchy? With respect to moving customers up the waste hierarchy, what were the program obstacles, opportunities, and decisions?

1. Can you describe your role in the Oregon pilot program? How were you involved in the design of the program? How are you involved in the implementation of the program?

2. A Paint Product Stewardship goal was to have a leftover paint management system that strived to use methods highest on the following waste management hierarchy:

    - Reuse
    - Recycling (into paint or other products)
    - Energy recovery (generally applicable to oil-based paint)
    - Proper Disposal

EPA often talks about their waste hierarchy, "reduce; reuse; recycle." How do you interpret the tiers of the preferred waste hierarchy for the Oregon program?

   a. Do you think the four bullets above cover the methods the Program was designed to prioritize?

Another separate goal was to have consumers generate no or less waste paint and containers, i.e. to reduce post-consumer paint generation by changing consumer purchase behavior.

   b. Do you think "Reduce" belongs somewhere in the hierarchy for the Oregon program?
        i. Do any other items belong in the hierarchy?
   c. *Who and how was this hierarchy determined? Is the hierarchy defined in the law?*

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d. *Do you have any thoughts or information on what the basis of using this hierarchy was?*

3. How successful do you feel the program was at achieving these goals?
   a. Do you have any data to support that?

4. Overall, how do you think the program was designed to move consumers up the waste hierarchy?
   a. Was this different in implementation?
   b. What emphasis is placed on reducing the amount of paint purchased?
   c. What emphasis is placed on reusing paint?
   d. What emphasis is placed on recycling paint?

5. What barriers exist to moving consumers up the hierarchy?
   a. Are there program structure barriers to moving up the hierarchy?
   b. Are there barriers in the structure of the law to moving up the hierarchy?
   c. What barriers exist at the retailer level? Are there conflicts between retailer goals to sell product and the Program's goals to reduce waste?
   d. Not all Household Hazardous Waste collection sites offer reuse as an option for collected paint. How does this affect program goals?

6. What recommendations can you make to improve movement up the hierarchy?
   a. What opportunities exist to get more consumers up the hierarchy?

7. Are you familiar with any other options for reusing leftover paint and/or recycling options that the Oregon program currently doesn't include (e.g., exporting darker colors to Asia, where demand is higher)? Do you think Oregon or future programs should explore these?

Now I want to go over a number of questions thinking about each component of the program individually. Below is a list of the program components as they appear in the graphic logic model on the web site (a printout of the logic model is provided on the next page):

- Transportation
- Collections
  - Retailers
  - Events
  - HHW
  - Curbside
- Exchange
- Reprocessing as Paint
- Reprocessing as Non-Paint
- Energy Recovery
- Disposal

Each of these components represents one piece of the paint management system in place for the Oregon program. First of all, do you feel these are accurate program components for the Oregon program? If not, what components would you modify, remove, or add?

I want to go through each component with you and have you answer the following questions for each, if possible:

a. Describe the program component and how it fits into the overall program
b. Who/what entity or organization is responsible for paint at this point in the Program process?
c. Can you categorize the component into one of the tiers of the waste hierarchy we discussed above?
d. In your opinion, how much relative emphasis does the program actually place on this component?
e. During program design, did you (and the others involved) consider how this component would contribute to moving a consumer up the waste hierarchy? If yes, can you elaborate?
f. If possible and if different than (c), discuss how this component of the program was implemented in practice to move a consumer up the waste hierarchy
g. Are you familiar with any program educational materials available concerning this component?
h. How convenient do you think it is for a consumer to use or take advantage of this component?
i. Does the program provide any infrastructure to support this program component?
j. What were the obstacles during design and implementation with regard to this component?
k. What opportunities or areas of improvement do you see with regard to this component?
l. What decisions were made with regard to this component?
m. Although the program has only been active for a short time, in your opinion, how is the performance of this component? In other words, is this program component "working" the way you expected?

[Removed from Appendix: Figure 1. Oregon Pilot Program Logic Model (www.paintstewardshipprogram.com)]

Interview Guide for Oregon Pilot Program - Hedrick Strickland, Duke University: Convenience and Infrastructure

1. Can you describe your role in the Oregon pilot program?

2. Can you briefly describe your findings related to the convenience and infrastructure of the program?

3. A Paint Product Stewardship goal was to have consumers generate no or less waste paint and containers, i.e., to reduce post-consumer paint generation by changing consumer purchase behavior. Did your evaluation have any findings related to the convenience or infrastructure in place to get consumers to *reduce* their paint purchases?

4. A second program goal was to have a leftover paint management system that strived to use methods highest on the following waste management hierarchy:
   • Reuse
   • Recycling (into paint or other products)
   • Energy recovery (generally applicable to oil-based paint)
   • Proper Disposal

   a. Did your evaluation have any findings related to the convenience or infrastructure in place to allow consumers to *reuse* paint?
   b. How about with respect to *recycling* paint?
   c. And *energy recovery?*
   d. What about *proper disposal?*

5. With respect to convenience, infrastructure, and anything else included in your analysis, what obstacles do you see with regard to getting consumers into each of the tiers mentioned above?

6. Do you have any recommendations or notice any opportunities to improve convenience and infrastructure related to each of the tiers?

Interview Guide for Oregon Pilot Program – Metro
(Jim Quinn)

1. Can you describe your role at Metro? Can you describe Metro's role in the Paint Stewardship program in Oregon? How are you involved in the implementation of the program?

2. What happens to paint collected through the PaintCare program once it reaches Metro?
   a. Can you describe the sorting procedure at Metro that determines where paint received ultimately ends up?
   b. Who decides/what standards are used to evaluate the paint?

3. Have you seen any program materials about the PaintCare program and fee? Does Metro provide any educational materials to consumers (either about the PaintCare program or MetroPaint)?

4. What challenges has Metro encountered working with the PaintCare program?

5. What type of infrastructure (e.g., collection infrastructure) does Metro have in place to support its operations?

6. What are your thoughts on the convenience for consumers to buy and use MetroPaint? What about convenience for consumers to drop off leftover paint that would end up as MetroPaint's raw materials?

7. Metro's website indicates that residents cannot drop off leftover paint at the MetroPaint store. Why does the store not act as a collection site?
   a. What barriers exist for a retail location like this to becoming a collection site?

8. Have you noticed any changes in the amount of MetroPaint purchased since the program began? If so, do you think these changes are attributable to the program?

9. One of the Paint Product Stewardship goals is to have consumers generate no or less waste paint, i.e. to reduce post-consumer paint generation by changing consumer purchase behavior. Does this goal conflict with MetroPaint goals?

10. Are you familiar with any other options for reusing leftover paint and/or recycling options that Metro and PaintCare don't currently include? (e.g., exporting darker colors to Asia, where demand is higher)?

11. Do you have any thoughts on how a state-wide stewardship program could increase opportunities for Oregon residents to reuse paint? What about to increase the purchase of recycled paint?

12. What recommendations can you make to improve the PaintCare program and its partnership with Metro?

Table C-1. Volume of Post-Consumer Paint Collected by Location

Collection Site Name	City/town	County	Facility Type	Total Gallons
Millers Home Center and Lumber	Baker City	Baker	Retailer	1,125
Thatcher's Ace Hardware	Baker City	Baker	Retailer	585
ReStore - Corvallis Benton	Corvallis	Benton	ReStore	3,510
Sherwin Williams - Corvallis #8049	Corvallis	Benton	Retailer	2,025
Miller Paint - Clackamas	Clackamas	Clackamas	Retailer	2,475
Estacada True Value	Estacada	Clackamas	Retailer	675
Miller Paint - Lake Oswego	Lake Oswego	Clackamas	Retailer	2,790
Molalla True Value	Molalla	Clackamas	Retailer	315
Astoria Builders Supply	Astoria	Clatsop	Retailer	3,285
City Lumber Company	Astoria	Clatsop	Retailer	225
Gearhart Builders Supply	Gearhart	Clatsop	Retailer	270
Sherwin Williams - Gearhart #8275	Gearhart	Clatsop	Retailer	2,790
Columbia County	St Helens	Columbia	HHW / solid waste site	4,140
Vernonia Hardware and Supply	Vernonia	Columbia	Retailer	900
Beaver Hill Disposal Site	Coos Bay	Coos	HHW / solid waste site	675
Benjamin Moore - Bayshore Paint	Coos Bay	Coos	Retailer	2,745
Myrtle Pt True Value	Myrtle Point	Coos	Retailer	180
Crook County Solid Waste	Prineville	Crook	HHW / solid waste site	188
Parr Lumber - 601 N Main Street	Prineville	Crook	Retailer	1,530
Kerr Ace Hardware Building Center	Brookings	Curry	Retailer	630
Gold Beach Lumber	Gold Beach	Curry	Retailer	90
Deschutes County	Bend	Deschutes	HHW / solid waste site	20,375
Mitchell Hardware	Bend	Deschutes	Retailer	90
ReStore Bend	Bend	Deschutes	ReStore	450
Rodda Paint and Decor	Bend	Deschutes	Retailer	1,530
Sherwin Williams - Bend #8554	Bend	Deschutes	Retailer	4,185
Sherwin Williams - Bend #8603	Bend	Deschutes	Retailer	495
Standard Paint and Abbey Carpet	Bend	Deschutes	Retailer	1,125
Lapine Ace Hardware & Building Supply	La Pine	Deschutes	Retailer	1,935
Redmond Habitat ReStore	Redmond	Deschutes	ReStore	3,285
Sherwin Williams - Redmond #8261	Redmond	Deschutes	Retailer	1,395
Lutton's Ace Hardware	Sisters	Deschutes	Retailer	1,665
Heartwood Resources	Roseburg	Douglas	Retailer	-
Sherwin Williams - Roseburg #8118	Roseburg	Douglas	Retailer	3,510
Harrison's True Value Hardware	Winston	Douglas	Retailer	585
John Day True Value	John Day	Grant	Retailer	270
Parr Lumber - 1 South Broadway	Burns	Harney	Retailer	180
Tri County - Hood River	Hood River	Hood River	HHW / solid waste site	2,880
Miller Paint - Ashland	Ashland	Jackson	Retailer	3,150
Drake's Paint & Supply	Medford	Jackson	Retailer	2,070
Medford School District	Medford	Jackson	Other site	135
Miller Paint Medford	Medford	Jackson	Retailer	4,635
Parr Lumber - 1231 Disk Dr.	Medford	Jackson	Retailer	90
Sherwin Williams - Medford #8157	Medford	Jackson	Retailer	3,510

Collection Site Name	City/town	County	Facility Type	Total Gallons
Glidden Professional Paint Center	Grants Pass	Josephine	Retailer	1,440
Sherwin Williams - Grants Pass #8182	Grants Pass	Josephine	Retailer	2,475
Sherwin Williams - Klamath Falls #8051	Klamath Falls	Klamath	Retailer	1,890
Cascade Home Center	Cottage Grove	Lane	Retailer	540
Forrest Paint Retail	Eugene	Lane	Retailer	15,570
Lane County	Eugene	Lane	HHW / solid waste site	12,529
Sherwin Williams - Eugene #8623	Eugene	Lane	Retailer	-
Tommy's Paint Pot	Eugene	Lane	Retailer	3,960
Square Deal Lumber	Springfield	Lane	Retailer	1,575
Lincoln County SW transfer station - Lincoln City	Lincoln City	Lincoln	HHW / solid waste site	720
Lincoln County SW transfer station - Newport	Newport	Lincoln	HHW / solid waste site	-
Sherwin Williams - Newport #8229	Newport	Lincoln	Retailer	270
Thompson's Sanitary SVC	Newport	Lincoln	HHW / solid waste site	-
Dahl Disposal Service	Toledo	Lincoln	Other site	-
Lincoln County SW transfer station - Toledo	Toledo	Lincoln	HHW / solid waste site	-
Lincoln County SW transfer station - Waldport	Waldport	Lincoln	HHW / solid waste site	-
ReStore Albany Area	Albany	Linn	ReStore	3,825
Sherwin Williams - Albany #8080	Albany	Linn	Retailer	1,260
ReStore Lebanon	Lebanon	Linn	ReStore	675
Hoys True Value Hardware	Sweethome	Linn	Retailer	135
Kinney Bros & Keele True Value Hardware	Ontario	Malheur	Retailer	585
Keizer #8609	Keizer	Marion	Retailer	1,260
ReStore Mt. Angel	Mount Angel	Marion	ReStore	-
Capital Paint	Salem	Marion	Retailer	585
Marion County	Salem	Marion	HHW / solid waste site	2,970
Salem (North) #8014	Salem	Marion	Retailer	-
Sherwin Williams - Salem #8014	Salem	Marion	Retailer	1,170
Sherwin Williams - Salem #8018	Salem	Marion	Retailer	1,620
GW Hardware	Woodburn	Marion	Retailer	90
Rodda Paint-GW Hardware	Woodburn	Marion	Retailer	225
Morrow County Public Works (Boardman)	Boardman	Morrow	HHW / solid waste site	-
Morrow County Public Works (Lexington)	Lexington	Morrow	HHW / solid waste site	-
Miller Paint - Gresham	Gresham	Multnomah	Retailer	6,255
Kaleidoscope Paint	Portland	Multnomah	Retailer	1,395
Kelly Moore 82nd Ave	Portland	Multnomah	Retailer	3,195
Parkrose True Value Hardware	Portland	Multnomah	Retailer	2,250
Powell Paint Center	Portland	Multnomah	Retailer	-
Powell Villa Ace Hardware	Portland	Multnomah	Retailer	-
ReStore Portland	Portland	Multnomah	ReStore	3,015
Rodda Paint Eastside	Portland	Multnomah	Retailer	1,935
Sherwin Williams - Roosevelt # 8239	Portland	Multnomah	Retailer	2,475
Sherwin Williams - Pendleton #8499	Pendleton	Umatilla	Retailer	1,665
Miller Home Center	La Grande	Union	Retailer	630
Sawyer's True Value	The Dalles	Wasco	Retailer	360
Tri County - The Dalles	The Dalles	Wasco	HHW / solid waste site	1,890
Suburban Ace Hardware Inc	Aloha	Washington	Retailer	6,210
ReStore Beaverton	Beaverton	Washington	ReStore	-
Rodda Paint Progress	Beaverton	Washington	Retailer	3,780

Collection Site Name	City/town	County	Facility Type	Total Gallons
Miller Paint - Portland (Beaverton)	Portland	Washington	Retailer	2,070
Miller Paint - Portland (Murray Rd)	Portland	Washington	Retailer	4,365
Sherwin Williams - Commercial Location Tualatin	Tualatin	Washington	Retailer	6,750
McMinnville #8085	McMinnville	Yamhill	Retailer	495
ReStore McMinnville	McMinnville	Yamhill	ReStore	3,420
Newberg Hardware	Newberg	Yamhill	Retailer	2,475
				198,692

Source: PaintCare, 2011b, Appendix D.

Note: PaintCare's values were not broken out by facility type. These are categorized for this table based on collection site name and location. Additionally, the values do not include HHW collection events or collections from collection sites operated by Metro.