



California Integrated Waste
Management Board

November 19, 2007

Contractor's Report
To The Board

California Electronic Waste Recycling Act
ANALYSIS OF 2006 NET COST REPORTS

Produced Under Contract by:

**Humboldt State University
Sponsored Programs Foundation
and R. W. Beck, Inc.**

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Executive Summary

The California Electronics Recycling Act (the Act) required all approved collectors and recyclers to submit a report for 2006 on their net costs for handling covered electronic wastes (CEW) to the California Integrated Waste Management Board (CIWMB) by March 1, 2007. CEW includes the following product types with a viewable screen size greater than four inches:

- Cathode ray tube (CRT) devices (including televisions and computer monitors)
- LCD desktop monitors
- Laptop computers with LCD displays
- LCD televisions
- Plasma televisions

This report provides an analysis of these 2006 net cost reports to assist CIWMB in administering the program, including its need to ensure fund solvency and periodically consider changes to the standard payment rates.

Net cost reports covering 2005, the program's first year, were analyzed in a separate report to CIWMB in April 2006. Future net cost report requirements are subject to CIWMB determination.

Methodology

CIWMB retained the research team of Humboldt State University's Office for Economic and Community Development and R.W. Beck, Inc. to develop a reporting system and to analyze net cost reports

The research team analyzed a representative sample of reports (see Table 1) by reviewing the reports and confirming the data through telephone and e-mail communications with submitting organizations. The review focused on ensuring that data were entered accurately and consistently, and that the team's interpretation of data was correct. The review did not constitute a formal audit, and supporting documentation beyond the submitted report was not reviewed.

Table 1 Summary of Sample of Reports Analyzed

Item	Analyzed Sample	Percent of 2006 Totals
Number of Recovery Reports	43	10%
Number of Dual Entity Reports ¹	22	39%
Total Recovered Pounds CEW in Analyzed Reports	80,274,921	63%
Total Recycled Pounds CEW in Analyzed Reports	111,597,935	87%

1) Dual entity reports cover both recovery and recycling, so a total of 65 reports covering recovery activities were included in the study sample.

The team determined that the selected entities' reports reflect the range of circumstances experienced by participating organizations. Notwithstanding that, the accuracy of the analysis is dependent upon the completeness and accuracy of the self-reported data and information included in the reports.

The submitting organizations and the research team both continued to learn valuable lessons during this second program year while applying lessons learned from the 2005 analysis. Most notably, separating out

costs for handling CEW from other business activities is notoriously difficult, and the allocation methods used necessarily contribute to variability in reported net costs.

Analysis of Reported Net Costs

Figure 1 shows the reported net cost per pound for each of the 65 reviewed and confirmed recovery activity reports included in the study sample. Figure 2 shows the reported net cost per pound for the 20 recycler reports included in the sample. Table 2 allows comparison of 2006 and 2005 revenue, cost, and net cost values for both recovery and recycling.

Figure 1. Recovery Net Costs Included in the Study Sample

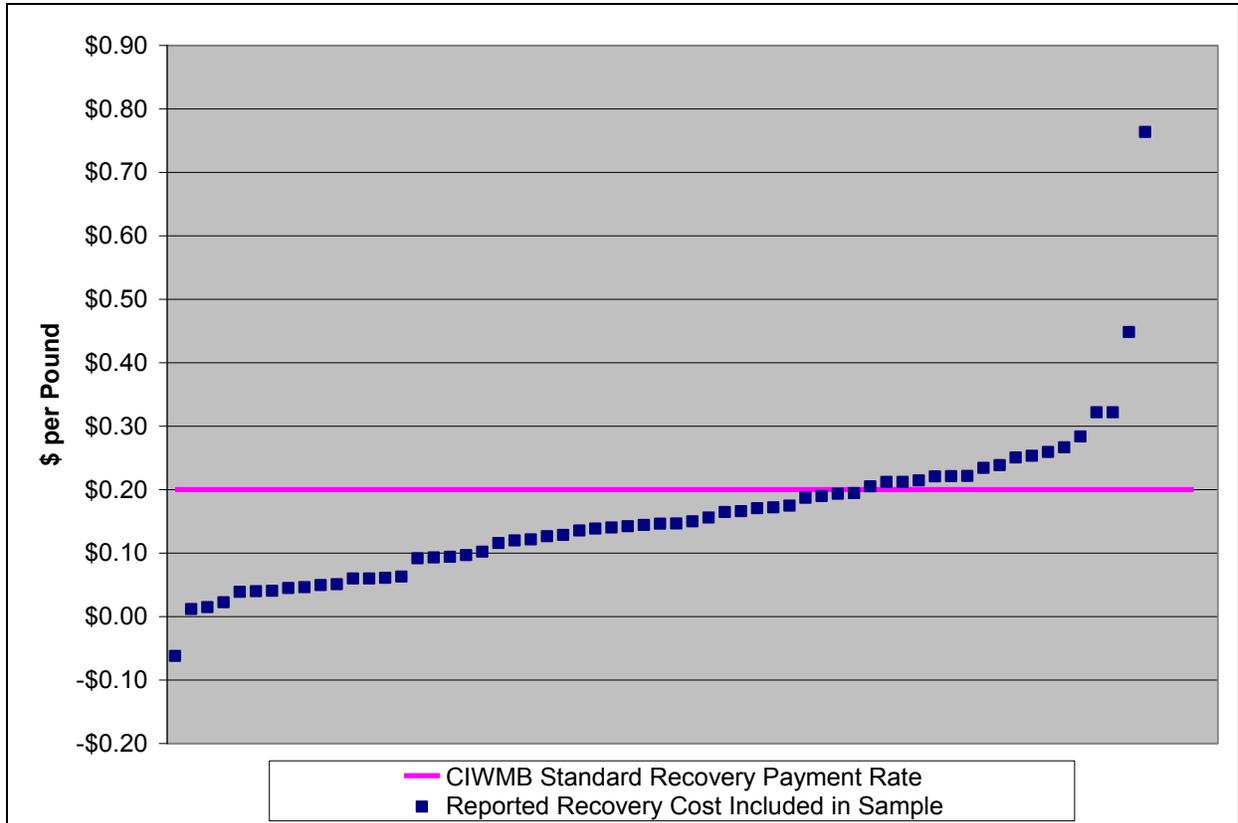


Figure 2. Recycling Net Costs Included in the Study Sample (\$ per Pound)

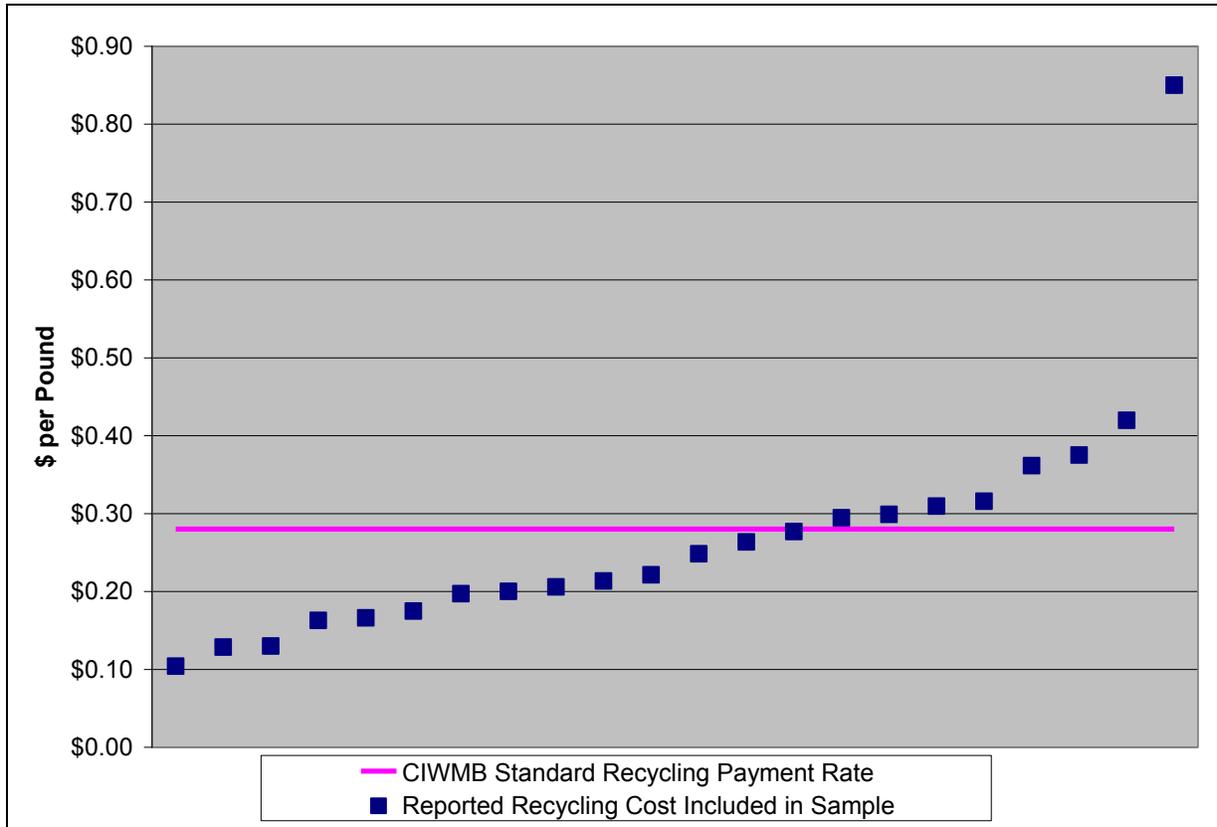


Table 2. Summary of Recovery and Recycling Net Costs per Pound (Cents/lb.)¹

	Item	2006 Reports ²				2005 Reports ³			
		Weighted Average	Mean	Median	% Lower than Standard Payment Rate	Weighted Average	Mean	Median	% Lower than Standard Payment Rate
Recovery	Revenue	2.0	2.3	0.4	NA	3.9	3.8	0.0	NA
	Cost	18.7	17.2	15.0	NA	21.0	24.6	17.9	NA
	Net Cost	16.7	14.9	14.2	66%	17.1	20.8	15.3	63%
Recycling	Revenue	5.8	6.2	5.3	NA	5.7	5.5	5.1	NA
	Cost	27.4	37.2	29.0	NA	30.9	39.1	31.8	NA
	Net Cost	21.5	31.0	23.5	64%	25.2	33.6	27.5	50%

Notes:

- 1) Net cost equals costs minus revenue. However, due to the nature of the statistics, this formula does not hold exactly for the median column.
- 2) Based on a sample of 43 reviewed and confirmed collector reports and 22 dual entity reports including both recovery and recycling activities.
- 3) Based on a sample of 29 reviewed and confirmed collector reports and 20 dual entity reports including both recovery and recycling activities

Comparison of 2005 and 2006 Net Costs

Recovery

As Figure 1 shows, more than half of the sample entities had net recovery costs that were less than the CIWMB standard payment rate of \$.20 per pound. The net costs per pound for CEW recovery ranged from \$-.06 to \$.76 per pound.

By comparison, in 2005 more entities reported net costs greater than the standard \$.20 per pound, and the range was wider: from \$-.48 to around \$1.20 per pound.

The narrower range in 2006 may be due to improvements in the reporting documentation, the training provided, and the entities having had some experience in completing the Net Cost Reports, resulting in more accurate and standardized cost data.

As Table 2 shows, in 2006 both the weighted average of recovery revenues and the mean revenues decreased from 2005 amounts. The median revenue, however, increased.

Recovery costs, on a per-pound basis, were all lower in 2006 than in 2005. The 2006 weighted average cost per pound decreased 11 percent, the mean cost per pound decreased 30 percent, and the median cost decreased 16 percent. One likely factor leading to these lower recovery costs is increased efficiency as collectors gained experience compared to the program's first year.

Similarly, the resulting net costs per pound were also lower in 2006 than in 2005. The weighted average declined 2.3 percent, the mean net cost decreased 28 percent, and the median net cost per pound declined 7 percent.

Recycling

In terms of net recycling costs, 2006 were also generally lower than in 2005, with a range of \$.10 per pound to \$.86 per pound. Sixty-four percent of the sample recyclers reported their net costs per pound being less than CIWMB's standard of 28 cents per pound. This is an increase over 2005, when only 50 percent indicated that their net costs were below the standard.

The weighted average of revenues for recycling was 5.8 cents per pound, a slight increase over last year's 5.7 cents per pound. The mean revenue increased more significantly – 11.3 percent, while the median revenue increased only slightly by 0.2 cents per pound.

Recycling costs in 2006 all declined from 2005 amounts. The weighted average decreased 11 percent, the weighted average decreased nearly 15 percent, the mean net cost decreased 7.7 percent, and the median net cost declined nearly 15 percent.

Summary of Findings

1. Net costs vary widely across reporting organizations.
2. Based on three of four alternative measures, the current standard payment rates (20 cents per pound for recovery and 28 cents per pound for recycling) more than cover typical reported net costs.
3. Half of collectors in the study sample reported recovery revenue in 2006. If this revenue were excluded from the analysis, a majority of collectors still would have received a positive cash flow for recovery activities based only on CIWMB payment revenue (e.g., net costs would be less than the current standard payment rate).
4. Proposals for a "reasonable rate of profit" among collectors vary considerably.

Trends and Considerations

The following market and industry trends each have implications that may be relevant to CIWMB's consideration of program adjustments:

- The California electronics recycling industry is growing steadily, in terms of the number of players and total volume handled. For example, between 2005 and 2006 the number of participants increased from just over 300 to well over 500, and the volume handled increased from 65 million pounds to over 128 million pounds.
- The California electronics recycling industry is still young and evolving rapidly; as a result, net costs may be somewhat erratic for the foreseeable future. For example, start-up and expansion of operations, mergers and acquisitions, experimentation with new contracting and supply terms are common and can complicate generalizations about net costs.
- Intense competition among recyclers is driving up prices paid to collectors and pushing firms to offer an ever-wider range of services. While in 2005 this practice was just beginning, with typical pass-through revenues in the 2 to 3 cent- per-pound range, by early 2007 reports of pass-through revenues as high as 10 cents per pound have been documented. Furthermore, some collectors are also beginning to pass through a portion of their standard payment to providers of CEW feedstock. Also, many recyclers feel compelled by market competition and customer demand to handle other types of electronics waste, in addition to CEW.

- Market demand and prices for recovered CEW components were relatively strong during the first two years of the program, but may become more volatile in coming years. On the other hand, concerns over increasing costs and decreasing demand for CRT glass are also growing, and could result in higher net costs in coming years. More research and work on market development is needed to ensure that viable markets remain available for CRT monitors and televisions, and for flat panel displays, especially as the latter increasingly dominate the market in coming years.
- Changing technologies for monitors and televisions will ultimately alter the economics of electronics recycling, but the effects of this trend have yet to appreciably affect recovery and recycling of CEW.

Every two years beginning on July 1, 2004, State statute requires CIWMB, in collaboration with the Department of Toxic Substances Control, to establish a payment schedule “to cover the net cost for an authorized collector to operate a free and convenient system for collecting, consolidating and transporting covered electronic wastes in the state,” and to “cover a recycler’s net cost to receive, process and recycle a covered electronic device from an authorized collector.”*

Because costs vary considerably for program participants due to a number of factors (as documented throughout this report), CIWMB is faced with a dilemma. No matter where CIWMB sets the payment rate, some organizations’ costs will be more than covered by the standard payment, and some will not.

The issues below indicate different approaches CIWMB may adopt to address this dilemma when considering potential adjustments to the standard statewide payment rates:

- What measure should be used to set payment rates? For example, each of the four measures presented in Table 2 above could serve as a basis for setting rates, yet each is influenced to a greater or lesser degree by large firms and firms with extraordinarily high or low net costs.
- Since only some collectors receive service-related fees for CEW, and the statute references “free and convenient” collection, how should recovery revenue be considered when setting rates? Removing collector revenue from the analysis is consistent with the “free and convenient” goal; however, many private firms will continue to earn revenue for the suite of services they offer, and allocating a portion to CEW recovery seems reasonable.
- Should CIWMB adjust recycling payment rates, collector payment rates or both? Depending on the amount of adjustment, each of these options could impact program participants and the market place in difficult-to-predict ways.
- Should CIWMB establish tiered payment rates for different types of collection and/or recycling operations? While this could result in a more efficient allocation of program funds, the high administrative burden may make it infeasible.

The implications of adjusting payment rates include:

- Increasing rates may tend to decrease the incentive for achieving greater efficiency. Program participants who receive payments in excess of profit levels they view as acceptable may choose to pass through an increasing portion of state funds to suppliers, and/or allocate a high

* California Public Resources Code, Section 42478-42479.

percentage of the firm management's time and resources to gain market share, while making increasing efficiency levels a secondary priority.

- Greater payments may promote expansion of the number of firms involved in the program and the volume handled, along with attendant competitive pressures. Decreasing program payments could have the opposite impact, with volumes potentially decreasing.
- The increased volume combined with increased payment rates could potentially compromise the solvency of the fund. Conversely, reduced payment rates will help to safeguard fund solvency.
- Increasing payment rates means more program participants will have their costs covered, whereas decreasing payment rates means fewer will.
- Increasing payment rates means the gap by which program payments exceed actual costs will increase, whereas decreasing payment rates will have the opposite effect.
- Increasing payment rates may exacerbate the trend toward recyclers and collectors passing through a portion of their standard payments, whereas decreasing rates may reduce this trend.

Section 1

Introduction

1.1 Background and Purpose

This report analyzes net cost reports for 2006, which were submitted to the California Integrated Waste Management Board (CIWMB) by approved collectors and recyclers in Spring 2006, as required under the California Electronic Recycling Act (the Act).

The report also compares 2006 costs with those reported for 2005 during the program's first year of implementation. Costs for 2005 are analyzed in detail under a separate report published by CIWMB in April 2006.

The purpose of this report is to assist CIWMB in administering the program, including addressing its need to ensure fund solvency and to periodically consider potential adjustments to standard recovery and recycling payments.

The Act is intended to provide "free and convenient" recycling services for *covered electronic wastes* (CEW) designated for inclusion under the program. CEW includes the following types of products:

- Cathode ray tube (CRT) devices (including televisions and computer monitors)
- LCD desktop monitors
- Laptop computers with LCD displays
- LCD televisions
- Plasma televisions

These are products with a viewable screen size greater than four inches.

Funding for the program is derived from a fee on sale of these products levied at the retail level, in the amount of \$6 to \$10, depending on screen size.

CIWMB developed the Covered Electronic Waste Payment System to reimburse approved collectors and recyclers for their net costs, including a reasonable rate of profit. At the program's initiation in January 2005, the standard statewide payment rates were set at 20 cents per pound for recovery and 28 cents per pound for recycling.

Payment requests are made by recyclers through claims submitted to CIWMB for review and approval. Recyclers receive the entire Combined Statewide Recovery and Recycling Payment Rate of 48 cents per pound, and are required to pass through the standard statewide recovery payment to approved collectors. The program requires a variety of documentation and sets other requirements designed to safeguard against fraud.

All approved collectors and recyclers were required to submit an annual net cost report to CIWMB by March 1, 2006, and again by March 1, 2007. Each report covers the previous calendar year. In summer 2007, CIWMB determined that net cost reports will again be due to CIWMB in March 2008, covering calendar year 2007. Future requirements for net cost reports will be subject to CIWMB determination.

CIWMB is authorized to adjust the retail fee and/or standard statewide recovery and recycling payments, based upon review of net cost reports and other information. To date CIWMB has only considered such changes once, in summer 2006, and chose to maintain the initial payment rates and retail fees.

CIWMB staff anticipates that the payment rates will again be considered in summer 2008. This report, analyzing costs in 2006 and comparing them with those for 2005, is intended to help inform CIWMB's consideration of changes.

Additional information on the program, including links to authorizing legislation and detailed regulations, is available on CIWMB's Internet website at <http://www.ciwmb.ca.gov/Electronics/Act2003/>.

1.2 Report Organization

- Section 2 summarizes the report methodology.
- Section 3 analyzes 2006 net costs for collection, including a comparison with 2005 results.
- Section 4 analyzes 2006 net costs for recycling, including a comparison with 2005 results.
- Section 5 presents trends and considerations related to review of standard payment rates.
- Appendix A presents the net cost reporting forms used to report revenue and costs covering 2006.

Section 2

Methodology

2.1 Steps in the Analysis

CIWMB retained the team of Humboldt State University's Office for Economic and Community Development and R.W. Beck, Inc. to develop a reporting system and to analyze net cost reports submitted in the first two reporting years. The reporting system consists of the following three standard forms:

- A one-page net cost report summarizing revenue, costs, pounds handled and the net cost per pound (Form 220)
- A two-page worksheet for documenting recovery revenues and costs (Form 220a)
- A two-page worksheet for documenting recycling revenues and costs (Form 220b)

Additionally, the team prepared a Guide to Net Cost Reporting to assist collectors and recyclers in using the forms. The Guide and the reporting forms were revised after the analysis of the first program year, with an aim towards streamlining and simplifying the reporting process.

As in the first year, two “webinar” training sessions were held prior to the report submission deadline, drawing a total of approximately 100 participants.

All of these materials, along with a recording of the training session and a list of frequently asked questions, are available online at:

<http://www.ciwmb.ca.gov/Electronics/Act2003/Recovery/NetCost/>

The basis for this report is a detailed analysis of a sample of net cost reports covering the second year of the program, calendar year 2006, which were submitted in spring 2007. The analysis of net cost reports presented in this report involved the following steps:

Step One: Select a Representative Sample of Reports to Analyze

The consulting team selected a representative sample of reports for review. Initially, the selected sample included:

- All dual entity reports
- The 20 largest collectors
- An additional 20 randomly selected collectors

The team then deleted several reports from the sample, either because they were not active in the reporting year, or because of complications with their reports. Additional reports were added as resources allowed.

The resulting sample analyzed included 65 reports, as summarized in Table 3 below. The 22 dual entities' reports analyzed comprise 39 percent of the 56 dual entity reports submitted, reflecting 87 percent of all reported recycling volume. The 43 collectors' reports analyzed constitute 10 percent of the 432 submitted collector reports, reflecting (along with the collection volume from analyzed dual entity reports), 63 percent of all collectors' volume. Moreover, the analyzed organizations include a good mix of large- and small-volume operators in a mix of rural and urban areas, located in diverse regions of the state.

Table 3. Summary of Sample of Reports Analyzed

Item	Analyzed Sample	Percent of 2006 Totals
Number of Collector Reports ¹	43	10%
Number of Dual Entity Reports	22	39%
Total Recovered Pounds CEW in Analyzed Reports	80,274,921	63%
Total Recycled Pounds CEW in Analyzed Reports	111,597,935	87%
1) Dual entity reports cover both recovery and recycling, so a total of 65 reports covering recovery activities were included in the study sample.		

Step Two: Review and Confirm Selected Reports

Each of the selected reports was reviewed and confirmed through phone, email and fax correspondence with the submitting organization. The confirmation included verification that the report was filled out correctly, and (to the extent practical) explanations of any extraordinarily high or low values and. The confirmation process did not include on-site review of documentation or “auditing” of reports.

The team also conducted supplementary interviews and requested additional information from selected organizations regarding market trends and the types of collection program services provided and type of processing activities undertaken by recyclers.

Step Three: Analyze Data

Once the reports in the selected sample were confirmed, the data were compiled in an electronic database and analyzed, as described in the remainder of this report.

2.2 Level of Confidence in Results

The research team determined that the sample of net cost reports analyzed in this report is representative of the range of organizations participating in the program during the study year of 2006.

The study is based on self-reporting by program participants. This self-reporting was not subject to on-site review or audits. Rather, the study team confirmed the consistency and interpretation of information in the reports via telephone and email correspondence with submitting organizations. The accuracy of the study findings are dependent upon the completeness and accuracy of the self-reported information included in the study sample. Both submitting organizations and the research team learned valuable lessons during the first program year (see 2005 report).

Further modifications to the reporting forms may be made that will simplify and expedite reporting and analysis of 2007 costs. That, combined with a general maturing of the CEW collection and recycling industry (albeit with continued, rapid evolution) means that the analysis of 2007 net costs will provide an even more up-to-date, complete and accurate picture of net costs.

2.2.1 Potential Sources of Error

As stated previously, the selected sample of analyzed reports is representative of the range of organizations participating in the program. But it is also representative of the range of potential sources of error in accurately describing net costs. These potential sources of error include:

- Organizations determined CEW handling costs by allocation rather than direct accounting because their accounting systems capture costs for a broader range of business activities (e.g., handling other types of e-waste along with CEW). Typically volume-based allocation was used by applying the percentage of total CEW pounds handled to estimate line items such as advertising or general overhead expenses. Other allocation methods used less frequently included a revenue-based allocation and a direct labor-based allocation.
- The team's analysts may have misunderstood what revenues or costs program participants included in certain line items on submitted net cost reports and worksheets. For example, in situations where no entry was made on a particular line item (e.g., Form 220a, line 9, "transportation from collector facility to recycler facility"), it was not always clear whether a missing line item indicates that no costs were incurred, whether the costs were incorrectly included elsewhere, or whether the submitting organization was simply unable to identify the costs.
- In 2006 some organizations were in a start-up mode and/or engaged in new partnerships or affiliations that may have complicated cost accounting and allocations. And, even for organizations already involved with CEW collection or recycling, accounting systems had to be re-vamped to track specific CEW related costs.
- The California electronics recycling industry is young and is changing rapidly. Cost structures are likely to differ markedly among organizations for some time, as innovation and competition for market share lead to constant adjustments, mergers, acquisitions and partnerships.

Because the analysis of net cost reports did not include on-site review of documentation or audits, no independent verification of the reports was conducted. Rather, reports included in the study sample were confirmed through discussions with submitting organizations to confirm that data were entered correctly and consistently, and that the team's interpretation of entered data was correct.

Section 3

Analysis of Recovery Net Cost

3.1 Overview

This section summarizes the analysis of recovery revenues and costs. This overview focuses on net cost-per-pound estimates as reported in the study sample. The project team confirmed and revised these estimates as needed.

Figure 3 shows the reported net cost per pound for the 43 reviewed and confirmed recovery activity reports, arranged from lowest to highest.

As discussed in Section 2.1 above, this sample comprises 10 percent of all submitted collector reports plus 39 percent of all submitted dual entity reports (which include both recovery and recycling). In all, the 65 reports represent 87 percent of all CEW handled in 2006.

Figure 3. Reported Recovery Net Costs Included in the Study Sample (\$ per Pound)

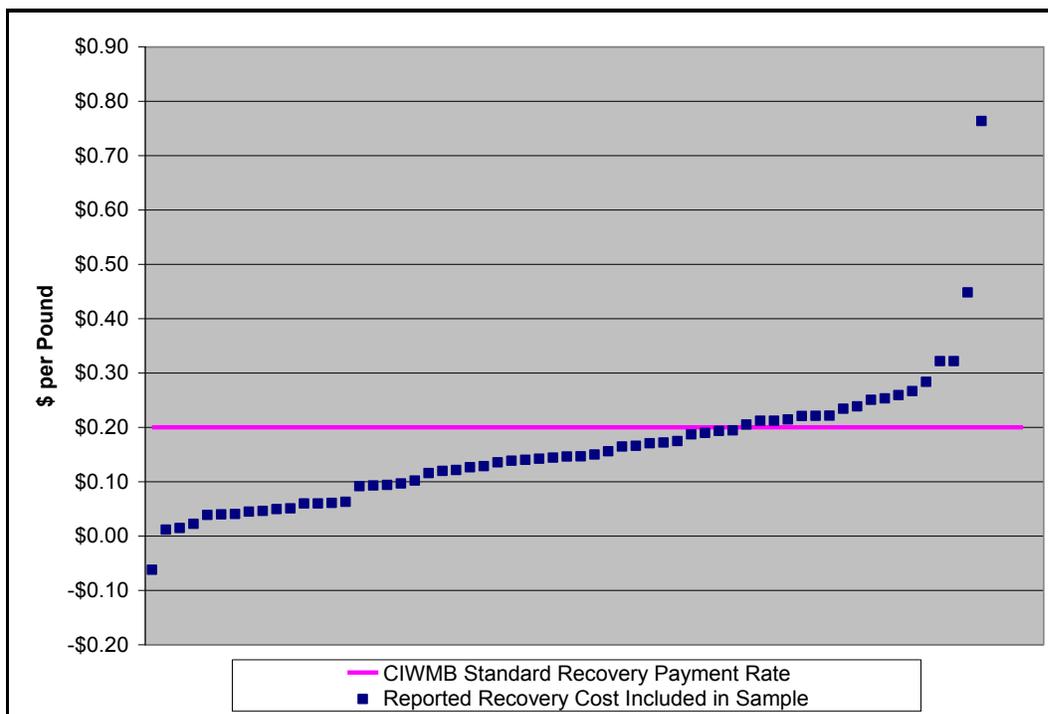


Table 4 summarizes the analysis of these recovery net cost reports. The table lists four measures that convey important information useful in understanding how net costs vary.

- The **weighted average** is a measure of overall program-wide performance that weighs each firm according to the total number of pounds of CEW it handles (e.g., firms handling more CEW influence the weighted average more than smaller firms). It is calculated by adding values from all submitted reports, and dividing the sum by the total number of pounds reported.

- The *mean* is the average of each firm’s reported value, with all firms considered equally, regardless of their size.
- The *median* is the reported value which half of the sample is above and half is below.
- The *percentage of reports lower than standard payment rate* indicates the percentage of reports in the sample that showed a recovery net cost per pound less than the current standard recovery payment rate of 20 cents per pound based on data they reported.

Table 4. Summary of Recovery Net Cost per Pound Estimates (cents per pound)

Item		Weighted Average	Mean	Median	Percentage Lower than Standard Payment Rate
Recovery	Revenue (all reports)	2.0	2.3	0.4	NA
	Cost	18.7	17.2	15.0	NA
	Net Cost	16.7	14.9	14.2	66%

1) Based on a sample of 43 reviewed and confirmed collector reports and 22 dual entity reports.

2) Net cost equals costs minus revenue. However, due to the nature of the statistics, this formula does not hold exactly for the median column.

3.1.1 Summary of Findings

The following findings are based on Figure 3 and Table 4 above.

Finding: Recovery net costs vary widely across reporting organizations.

Different types of organizations reported significantly different net costs per pound. And, a small number of organizations reported “outlier” costs that are substantially lower or higher than most other organizations.

Reasons for differences in reported costs include different management practices, different levels of throughput, differences in targeted generator types, different types of collection programs, and whether revenue was received for collection services or from recyclers (over and above the standard 20 cent payment rate).

In addition to these operational differences, some firms experienced higher-than-normal costs due to one-time start-up costs associated with facilities and equipment purchases or modifications.

Only one collector analyzed reported negative net costs per pound. This was due to relatively low operating costs, combined with relatively high revenues derived from fees charged to CEW generators.

At the high end of the scale, net cost per pound for both collectors and recyclers reflects a combination of one-time start-up costs for move-in, facility additions, etc., as well as high labor and other cost items. In several cases, the high-cost firms stated that they have taken steps to alleviate such high cost structures.

Refer to Section 3.4 below for a detailed discussion of those factors that most influence variability of recovery net costs.

Finding: Estimates of “typical” net costs per pound for recovery vary from 14.2 to 16.7 cents per pound, depending on the measure considered.

Table 4 provides three separate measures of “typical” net cost per pound.

The weighted average of 16.7 cents per pound reflects the overall program cost, calculated as if the program operated as a single firm (i.e., by dividing the total reported costs by total pounds for all firms in the study sample). By its nature, this measure gives greater weight to firms that handled more CEW than smaller ones.

The mean of 14.9 cents per pound is an average of each firm's reported value. The fact that the weighted average is higher than the mean implies that some larger firms had higher costs than smaller firms. This may imply that factors other than economy of scale significantly influence price, at least in some circumstances.

The median of 14.2 cents per pound is the mid-point – half of the study sample had a net cost per pound below this value, and half above.

Finding: Approximately two-thirds of collectors report a net cost per pound below the current standard payment rate.

Based on the study sample, 66 percent of collectors reported a net cost per pound less than the current standard payment rate of 20 cents (e.g., net revenues are greater than the standard payment rate). This includes a mix of small and large organizations.

It appears that there are several businesses with relatively low per-pound collection costs, due to the fact that these businesses collect multiple materials. Therefore, a significant portion of costs can be allocated to other activities.

Many of the organizations that report having collection costs significantly greater than 20 cents per pound are recycling operations that collect a portion of their materials, but recycle many more pounds than they “collect.” Some are not-for-profit organizations/governmental entities, which tend to place a greater emphasis on providing service, as opposed to minimizing costs and maximizing revenues.

Finding: Half of collectors reported recovery revenue in 2006. Excluding this revenue, a majority of collectors still have net costs less than the current standard payment rate.

Thirty-three of the sampled collector reports listed some type of recovery-related revenue. In most cases, this revenue was derived from service fees charged to generators, and in a few cases, it reflects payments from recyclers over-and-above the standard 20 cent-per-pound payment (a growing trend in 2006).

The analysis of recovery costs presented excludes the standard 20 cents-per-pound CIWMB payment. If recovery revenue were to be excluded from this analysis, the resulting net cost would equal the total costs shown in Table 4. The weighted average and mean net cost per pound would be less than the current standard payment rate, and the median would be significantly less, at 15 cents per pound.

Finding: Proposals for a “reasonable rate of profit” among collectors vary considerably.

Program regulations allow participants to identify a “reasonable rate of profit or return on investment” in their net cost reports (Section 186610.10). Profit was excluded from the analysis of net costs presented in this report. However, participants were asked to identify and suggest a “reasonable rate of profit” for CIWMB's consideration when adjusting payment rates.

Forty approved collectors made suggestions that averaged about 17 cents per pound, but ranged from \$0.00 to \$1.00 per pound. Additionally, seven suggested profit rates in a percentage format. Of these, one suggested 10 percent, three suggested 20 percent, one suggested a range of 20 to 30 percent, and one suggested 33 percent of total revenues.

For comparison, assuming average total revenues of 22 cents per pound (the sum of the 20 cent standard recovery payment and the weighted average recovery revenue of 2.0 cents per pound), a 20 percent profit rate equates to 3.7 cents per pound, a 10 percent profit rate equates to 2.0 cents and a 5 percent profit rate equates to 1.1 cents per pound.

3.2 Recovery Revenue

As shown in Table 4, the weighted average collection revenue reported was 2.0 cents per pound, and varied from 0 to 45.3 cents per pound. In all, 33 of 65 analyzed reports (50 percent) reported receiving revenue for collection services beyond the standard payment. Virtually all of these were related to fees charged to generators for collection services, with an undetermined percent of revenue also derived from payments to collectors from recyclers in excess of the standard 20 cent per pound as required by CIWMB.

In 2005, this trend had just begun and such surplus payments, where they occurred, were typically on the order of 2 cents per pound. Anecdotally, the trend is intensified in 2006 with some recyclers reportedly paying collectors as much as 10 cents per pound over and above the standard payment.

Service fees take different forms. While most programs have eliminated specific per-unit fees for recycling CRTs and other covered electronic waste, some continue to charge a fee. In addition, commercial firms specializing in hazardous waste management and asset management may receive fees for collection of a wide range of materials, including but not limited to covered electronic waste. In such cases, firms typically allocated a portion of this collection service revenue to CEW, based on the portion of total electronic waste handled that is estimated to be CEW, by weight. Some government collection programs showed revenue derived from general solid waste management budgets not directly tied to CEW programs. While noted, the project team did not include such revenue in the analysis.

3.3 Recovery Costs

Table 5 shows the breakdown of weighted average recovery costs into three categories: labor, transportation and other.

Table 5. Breakdown of Weighted Average Recovery Costs

Measure	Labor	Transportation	Other	Total
Percent of Total Costs	48%	13%	39%	100%
Cents per Pound	9.1	2.4	7.2	18.7

3.3.1 Recovery Labor Costs

Labor costs comprised about half of all recovery costs, at a weighted average of 9.1 cents per pound. This is a decline from the 2005 average cost of labor of 10 cents per pound. The breakdown between direct and indirect labor costs was 60 percent and 40 percent, respectively, on a total cost basis. On a per-pound basis, direct costs were 61 percent of labor costs, and indirect costs were 39 percent of labor costs.

The 2005 analysis showed that during that year the split between direct costs and indirect costs was nearly even, which may reflect higher 2005 startup costs. Also, it is possible that entities gained a better understanding of how to track and report direct and indirect labor costs for 2006. Additional reasons for differing labor costs include the type of collection program used and the specific on-site management practices employed.

3.3.2 Recovery Transportation Costs

Transportation costs comprised about 13 percent of all recovery costs, or 2.4 cents per pound on a weighted-average basis. This is a decline from 2005 transportation costs, when transportation comprised 17 percent of all recovery costs, or 3.7 cents per pound on a weighted-average basis.

Reports broke transportation out into two categories. Sixty seven percent of this cost (2.5 cents per pound) is for transportation from generators to the collection facility, and 33 percent (or 1.2 cents per pound, on average), was associated with transportation to the recycling facility.

This breakout is very similar to 2005 report results, where transportation from the generator to the collection facility comprised 62 percent of collectors' transportation costs, and transportation from the collection facility to the recycling facility comprised 38 percent of the costs, on average. The slight decline in the cost of transporting to the recycler may be due to recyclers' increased competition for CEW.

Reasons for differing transportation costs include:

- Different types of collection programs (e.g., drop-off vs. pick-up)
- Whether transportation is handled by the firm or contracted out
- Transportation arrangements with the recycler (since 2005 a strong trend has apparently emerged for recyclers to pick up transportation costs)
- Whether some transportation costs were included in the "other costs" category (described below)
- Location and distance to shipping destination
- Specific transportation vehicles used and the materials shipped

3.3.3 Recovery "Other" Costs

The "other" category comprised 39 percent of all recovery costs, or about 7.2 cents per pound. This is an increase in percentage over 2005 "other" costs, but a decline when based on a weighted-average.

In 2005 just over one-third of all recovery costs, or about 7.3 cents per pound, on a weighted average basis, were attributed to "other" costs. The category of "other costs" serves as a catch-all category, and organizations were allowed to use the category to capture all types of costs that can be reasonably allocated to CEW recovery activities. The instructions and training provided to approved collectors and recyclers specifically stated that the sub-categories listed under "other" are flexible. This was done to reduce the reporting burden while encouraging reports that are as complete and accurate as possible. Some respondents chose to exclude several subcategories under "other," presumably because they were unable to estimate their costs for CEW handling.

For all of these reasons, the "other" costs category is the most variable. Table 6 provides a breakdown of recovery costs reported in the "other" category, including the percentage of reports that listed costs and the weighted average cents per pound for each subcategory. In terms of cents per pound, the most important subcategories were advertising, facilities and equipment rental/lease, and "other additional costs."

With two-thirds of reports including advertising, it was one of the most commonly reported "other" costs, and is relatively well defined. The other two top "other" cost categories, however, are less defined and

more variable. Some firms included costs in the “facilities and equipment rental/lease” and “other additional costs” sub-categories related to site development and start-up that they stated would decrease in future years. In a couple of instances this sub-category was partly responsible for outlier costs that were extraordinarily high compared to other reported costs.

Table 6. Breakdown of Recovery “Other” Costs

Line Item	Number of Sample Reports Listing	Percent of Sample Reports That Included Data For Each Line Item	Weighted Average Cost (Cents per Pound)
Advertising	52	90%	1.1
Processing and Disposal	18	31%	0.4
Supplies	49	84%	0.5
Depreciation	24	41%	0.2
Insurance	39	67%	0.4
Debt Service	21	36%	0.1
Fuel	30	52%	0.1
Maintenance	34	59%	0.8
Property Taxes	19	33%	<<0.1
Utilities	43	74%	0.4
Facilities and Equipment Rent/Lease	42	72%	1.9
Security	23	40%	<<0.1
Capital Costs ¹	<i>Excluded</i>	<i>Excluded</i>	<i>Excluded</i>
Other Additional Costs	15	26%	0.9
General Overhead	34	59%	0.8
Total	58	100%	7.2

(1) Capital costs were not included in this analysis. Fourteen entities (collectors and dual entities) reported an estimated \$794,892 in capital costs.

3.4 Factors Influencing Collectors’ Net Cost per Pound

A number of factors influence the recovery net cost per pound. Because the effect of each factor is difficult to separate from others, and also because the program is relatively new, data from this analysis of 2006 net cost reports may not provide quantitative conclusions on exactly how these factors influence costs. However, they are likely to be more indicative of actual costs than the 2005 report results, simply due to organizations’ having increased familiarity and educational opportunities regarding the reporting process. Additional data in future years may continue to assist in better understanding how and why recovery costs vary. Nevertheless, the following sections describe each factor identified and aid in understanding how collection operations vary.

3.4.1 Amount of Revenue Received for Recovery Activities

Recovery revenue, derived either through collection service fees or supplemental recycler payments, directly reduces net costs. As discussed in Section 3.2 above, of the 65 reviewed reports, 33 showed recovery revenues, generally derived from service fees charged to generators. While many collectors have

decreased or eliminated such fees, many others, in both public and private sectors, continue to charge them.

Payments from recyclers over-and-above the 20 cent standard contributed to an unidentified portion of recovery revenue. This is a trend which has reportedly intensified during 2006, with some recyclers reportedly paying up to 10 cents per pound beyond the standardized payment.

Additionally, some generators are beginning to conduct auctions seeking the highest bidder to collect their CEW (and often, other electronics waste).

Regardless of the source, revenue directly reduces net costs. Based on the sample of reviewed and confirmed net cost reports, in 2006, the 34 recovery reports showing revenue had a weighted average net cost of 22 cents per pound, compared to 14 cents per pound for the 31 that did not report revenues.

3.4.2 Volume

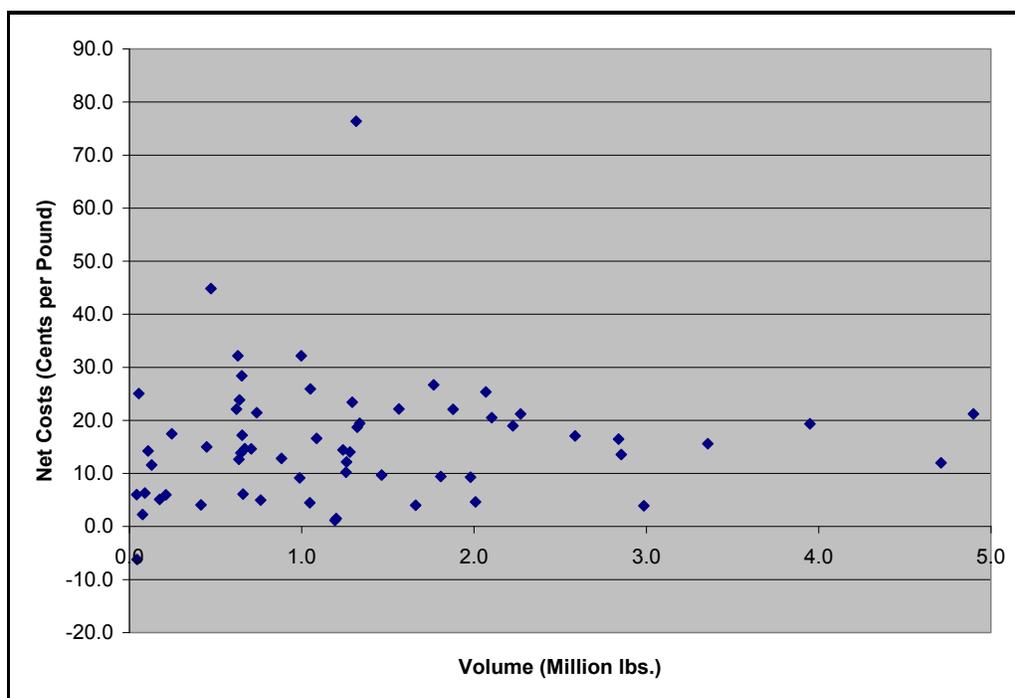
Higher-volume collectors tend to have lower costs. As the March 2006 report indicated, instability during the program's first year made economy-of-scale benefits less predictable. It is reasonable to expect that, due to economies of scale, large collectors would have lower unit costs than small collectors.

As illustrated in Figure 4, however, this relationship is not as clear as might be expected. The results for 2006 data are similar to the results for 2005. While some low-volume collectors had very high costs, and some relatively large-volume collectors had relatively low costs, there are many reports that do not appear to follow this rule.

One possible reason is that many organizations are still relatively new, and still in the process of stabilizing their cost structures. Some organizations are also in the process of stabilizing relationships with parent companies, or other partnering organizations. Another reason for some of the outliers is the high variability of revenue received by recovery organizations. For example, one low-volume organization reported a net cost per pound of -6.2 cents per pound. This was an individual who had relatively low costs, and received revenues beyond the standard payment from recyclers.

There were not, however, collectors that handled large quantities of material (more than 3 million pounds, for example) that had net costs significantly greater than the standard \$0.20 per pound. Compared with 2005, there were more collectors handling greater quantities of material in 2006.

Figure 4. Recovery Net Cost per Pound vs. Volume Handled



3.4.3 Type of Targeted Generator

Recovery programs targeting non-residential CEW generators appear to cost less than those targeting residential generators.

As shown in Table 7, based on a limited sample, 32 percent of collection programs target residential generators and have a weighted average net cost of 18.8 cents per pound (compared with 22.8 cents per pound in 2005). In comparison, 14 percent of recovery programs target primarily non-residential generators, with a weighted average net cost per pound of 16.9 cents per pound (compared with 10.9 cents per pound in 2005). It is interesting to note that the weighted average net cost of collection for residential programs decreased, while the weighted average net cost of non-residential programs increased, compared with 2005.

Table 7. Recovery Cost Comparison by Targeted Generator Type

Type of Generator Targeted ¹	Number of Sample Reports Analyzed ²	Percentage of Sample Reports Analyzed	Weighted Average Net Cost (Cents per Pound)
Residential	21	32%	18.8
Non-Residential	9	14%	16.9

1) Programs are defined based on their recovering at least 75% of their total volume from the indicated generator type.

2) Based on a limited sample of 30 respondents that submitted a supplemental questionnaire.

3.4.4 Type of Recovery Program Used

The type of recovery program used influences program cost. However, other cost factors may be more influential and tend to blur the importance of the program type employed. For example, a greater percentage of pick-up programs may be operated by private companies than government agencies.

As shown in Table 8 below, based on a limited sample of reporting organizations that completed a supplemental questionnaire, 29 percent of collection programs use pick-up programs (e.g., pick-up by appointment, curbside, and commercial scheduled collection accounts) at a weighted average cost of 17.9 cents per pound (compared with 15.4 cents per pound in 2005). Just under one fourth of programs use a permanent drop-off facility, with a weighted average cost of 11.3 cents per pound (compared with 17.6 cents per pound in 2005).

Possible reasons for the disparity between 2006 and 2005 results include the following:

- Pick up programs costs increased due to much higher fuel costs
- Collection programs received more pass through from processors' CIWMB payments, thus reducing net costs
- Drop-off programs may have become more efficient
- Drop-off programs may be able to allocate a portion of their costs to other types of programs, such as HHW collection programs

Table 8. Recovery Cost Comparison by Program Type

Type of Recovery Program ¹	Number of Sample Reports Analyzed ²	Percentage of Sample Reports Analyzed	Weighted Average Net Cost (Cents per Pound)
Pick-Up Programs ³	19	29%	17.9
Permanent Drop-Off Programs	15	23%	11.3

1) Programs are defined based on their recovering at least 75 percent of their total volume through the indicated program type.

2) Based on a limited sample of 34 reports that submitted a supplemental questionnaire.

3) Pick-up programs include pick-up from commercial and industrial clients (very common), as well as less common residential "curbside" pick-up programs for E-Waste.

3.4.5 Type of Organization

Private companies appear to have lower net costs than government programs, though additional data is required to confirm this. There is insufficient data to evaluate nonprofit operations and other differences in organization type at this time.

As shown in Table 9, private collectors had a weighted average net cost per pound of 16.5 cents (compared with 12.4 cents in 2005). This is less than government collectors at 26.0 cents per pound (compared with 52.6 cents per pound in 2005).

This limited sample was influenced by one large California municipality that reported very high net costs, in large part due to contractor charges associated with running permanent drop-off facilities for household hazardous waste. These costs were allocated to CEW based on the percentage of weight handled allocated to CEW. The other municipal programs had net costs at or below the standard 20 cents per pound.

Also, as shown in the table, other differences in cost were less significant and, due to the limited sample size, it may be premature to draw additional conclusions from the table.

Table 9. Net Cost of Collection By Type of Organization

Type of Organization	Number of Sample Reports Analyzed	Percentage of Sample Reports Analyzed	Mean Net Cost (Cents Per Pound)	Weighted Average Net Cost (Cents per Pound)
Private Company Collector	30	46%	14.7	16.5
Government Agency Collector	7	11%	17.1	26.0
Nonprofit Collector	6	9%	18.2	17.7
Sub-total	43	66%	30.4	17.9
All Sampled Dual Entities (Recovery Activities Only)	22	34%	13.7	14.6
Total	65	100%	14.9	16.7

3.4.6 Management Practices

As with any business, management plays a key role in the overall operation, efficiency and profitability of recovery operations. Even firms with very similar size and business models may have considerably different costs and revenues, based on management’s experience, savvy and general business acumen.

While not quantitatively analyzed in this report, an organization’s management practices are clearly a major cost determinant. In several cases, organizations stated that they had already taken steps to reduce the relatively high costs reported in 2005, such as closing particular facilities, adjusting labor and operating procedures, or other management practices. This includes the trend toward mergers and acquisitions, and the management savvy of collectors in taking financial advantage of increasing competition by recyclers to secure business from collectors.

Also, recovery organizations undertake a wide range of business activities in addition to CEW collection, including collection of other electronic waste, other waste or recyclables, hazardous waste management services, and asset management services. It is undetermined how these other business activities influence the cost of CEW recovery. However, many respondents noted that they are essentially obligated by customer demand to accept other electronic wastes beyond CEW, and that additional types of electronic waste should be incorporated into the CIWMB program in future years.

3.4.7 Changing Technologies and Design of Recovered CEW

This analysis of 2006 CEW recovery and recycling net costs is exclusively focused on CRT devices. As the number of LCD, flat-screen and other technologies in the recycling stream begin to increase; costs will surely be altered significantly. Analysis of this factor is beyond the scope of this study.

3.4.8 Rural Collection Activities

Collectors in rural areas face different conditions from those in more urban locations. These differing conditions may be reflected in lower volumes, higher transportation costs, different percentages of business versus residential services, lower labor and property costs and/or other differences. A brief analysis regarding the distribution of collectors and recyclers relative to population density is provided in Appendix B.

Section 4

Analysis of Recycling Net Cost

4.1 Overview

This section summarizes the analysis of recycling revenues and costs. It focuses on net cost-per-pound estimates as reported in the study sample. The following two sub-sections describe recycling revenue and costs, respectively, in more detail. The final sub-section explores the factors that most influence recycling net costs.

Figure 5 shows the reported net cost per pound for each of the 22 recycling activity reports included in the study sample, arranged from lowest to highest. As discussed in Section 2.1 above, this sample comprises 71 percent of all submitted dual entity reports (which include a section on both recovery and recycling). In all, 69 percent of all volume handled by CEW recyclers in 2006 is represented in the sample set of recycling reports analyzed. The outlier reporting net costs of \$.85 cents per pound is a nonprofit organization that recycles a relatively small amount of material, and has relatively high costs coupled with low revenues.

Figure 5. Recycling Net Cost Estimates Included in the Study Sample (\$ per Pound)

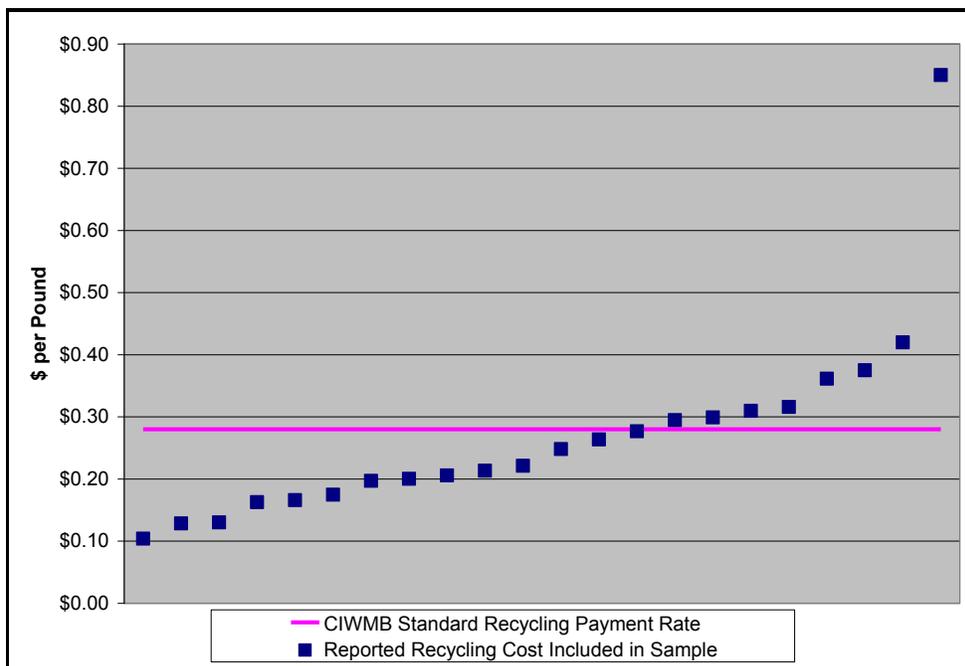


Table 10 summarizes the analysis of these 22 recycling net cost reports. As with the analysis of recovery costs in the previous section, the table lists four separate measures that each convey important information useful in understanding how net costs varies.

The **weighted average** is a measure of overall program-wide performance that weighs each firm according to the total number of pounds it handles (e.g., larger firms influence the weighted average more than smaller firms). It is calculated by adding values from all submitted reports, and dividing the sum by the total number of pounds reported.

The *mean* is the average of each firm’s reported value, with all firms considered equally regardless of their size.

The *median* is the value for which half of the sample is above and half is below.

Finally, the *percentage of reports lower than standard payment rate* indicates the percentage that showed a recovery net cost per pound lower than the current standard recovery payment rate of 20 cents per pound.

Table 10. Summary of Recycling Net Cost per Pound Estimates¹

Item		Weighted Average	Mean	Median	Percentage Lower than Standard Payment Rate
Recycling	Revenue	5.8	6.2	5.3	NA
	Cost	27.4	37.2	29.0	NA
	Net Cost ²	21.5	31.9	23.5	64%

1) Based on a sample of 22 reviewed and confirmed reports.

2) Net cost equals costs minus revenue. However, due to the nature of the statistics, this formula does not hold exactly for the median column.

4.1.1 Findings

The following findings are based on the analysis of the recycling net cost reports.

Finding: Recycling net costs vary widely across reporting organizations.

As with recovery net cost reports, some recycling organizations reported significantly different net costs per pound. There is one outlier with a reported net cost substantially higher than most other organizations, as mentioned above. Unlike CEW recovery entities, however, there were no recycler net cost reports in the study sample that would be considered low side outliers.

Reasons for differences in reported costs include different management practices, throughput, differences in the nature of recycling processing activities undertaken; market revenue received, and costs of CEW supplies. In addition to these operational differences, some firms experienced relatively high costs due to one-time start-up costs associated with facilities and equipment purchases or modifications.

See “Factors Influencing Recyclers’ Net Cost per Pound” below for a detailed discussion of the factors that most influence variability of recycling net costs.

Finding: Estimates of “typical” net costs per pound for recycling vary from 21.5 to 23.5 cents per pound, depending on the measure considered.

Table 10 provides three separate measures of “typical” net costs per pound for recycling activities.

The weighted average of 21.5 cents per pound reflects the overall, net program cost, calculated as if the program operated as a single firm (i.e., by dividing the total reported costs by total pounds for all firms in the study sample). This measure gives more weight to larger firms than smaller ones.

The mean of 31.0 cents per pound is an average of each firm’s reported value. It is higher than the weighted average because a small number of firms reported relatively high values, driving up the overall mean.

The median of 23.5 cents per pound is the mid-point – half of the study sample had a net cost per pound below this value, and half above.

It should be noted that all of these values have declined since 2005. The weighted average net cost declined from 25.2 cents per pound in 2005 to 21.5 cents per pound in 2006 – a decline of nearly 15 percent.

Finding: Half of recyclers report a net cost per pound below the current standard payment rate.

Based on the study sample, 50 percent of recyclers reported a net cost per pound less than the current standard payment rate of 28 cents per pound. It is apparent that other factors outweigh the influence of economy of scale. For example, management style, other business activities, whether the entity is involved in processing, and the extent to which they are involved in processing, efficiency of operation, mergers/acquisitions, and changing partnership agreements all influence net costs.

Note also that the lowest net costs are not with the largest recyclers (greater than 3 million pounds per year), but are with the companies in the 2 million pound-per-year range. While the largest 10 recyclers reported a net cost below the current standard payment rate, and seven of the smallest eight recyclers reported a net cost above the standard rate, in several instances costs were close to 30 cents per pound – thus relatively close to the standard 28 cents per pound. Overall, therefore, the data indicate that the industry is still evolving.

Finding: Proposals for a “reasonable rate of profit” for recycling activities vary.

As with recovery, program regulations allow participants to state what they believe constitutes a “reasonable rate of profit or return on investment” in their net cost reports (Section 186610.10).

Profit was excluded from the analysis of net costs presented in this report. However, participants were asked to identify and suggest a “reasonable rate of profit” for CIWMB’s consideration when adjusting payment rates.

Twelve approved recyclers whose reports were confirmed made suggestions that averaged to 22 cents per pound (the 2005 average suggested profit was 11.7 cents per pound.) Suggested rates of profit ranged from 5 to 50 cents per pound. Two entities suggested a profit of 20 percent. For comparison, assuming average total revenues of 33.8 cents per pound (the sum of the 28 cent standard recycling payment and the weighted average recovery revenue of 5.68 cents per pound), a 20 percent profit rate equates to 5.6 cents, a 10 percent profit rate equates to 3.1 cents and a 5 percent profit rate equates to 1.7 cents per pound.

4.2 Recycling Revenue

As shown in Table 10, the weighted average recycling revenue reported was 5.8 cents per pound of CEW delivered to the recycling facility (up slightly from 5.7 in 2005), with values varying from 0.6 cents to 23.2 cents per pound. The mean recycling revenue was 6.2 cents per pound (compared with 5.5 cents per pound in 2005) and the median was 5.3 cents per pound (compared with 5.0 cents per pound in 2005).

CEW recycling revenue is derived from the sale of recovered materials, including copper, ferrous metals, other wire and metals, mixed plastic, circuit boards, and occasionally other materials. The slight increase in recycling revenue is likely due to increased commodity pricing, which may be increasing the recyclers’ demand for CEW.

4.3 Recycling Costs

Table 11 shows the breakdown of weighted average recovery costs into the three main categories of labor, transportation and other.

Table 11. Breakdown of Weighted Average Recycling Costs

Measure	Labor	Transportation	Other	Total
Percent of Total Costs	44%	10%	46%	100%
Cents per Pound	11.9	2.7	12.6	27.2

4.3.1 Recycling Labor Costs

Labor comprised 44 percent of all recycling costs at a weighted average of 11.9 cents per pound. Percentage-wise, this is an increase over 2005 data (40 percent); however on a cents-per-pound basis, it is a decline from 12.2 cents. About 35 percent of labor costs are indirect, and 65 percent are direct, both on a total and cents-per-pound basis. In 2005 about one-fourth of all reported labor costs were indirect labor.

4.3.2 Recycling Transportation Costs

Transportation costs comprised about 10 percent of all recycling costs, or 2.7 cents per pound on a weighted average basis. This is an increase from 6 percent, and 2.0 cents per pound on a weighted-average basis from 2005. Twenty one entities reported transportation costs to markets, and nine reported “other” transportation costs.

The “other” transportation costs comprised 57.3 percent of total transportation costs among all recyclers, compared to 20 percent in 2005. This is an increase over last year, when only five recyclers reported “other” transportation costs. Presumably, these other transportation costs relate to providing transportation services on behalf of collectors, indicating that this trend is growing.

4.3.3 Recycling “Other Costs”

The “other cost” category comprised just under half (46 percent) of all recycling costs, or about 12.6 cents per pound on a weighted average basis. This is a decrease over 2005 reports, where other costs comprised 54 percent of total costs, or 16.7 cents per pound on a weighted average basis.

The category of “other costs” serves as a catch-all category, and organizations were allowed to use it to capture all types of costs that can be reasonably allocated to CEW recovery activities. The instructions and training specifically stated that the sub-categories listed under “other” are flexible. This flexibility was intended to reduce the reporting burden while encouraging reports to be as complete and accurate as possible. Some respondents chose to exclude several subcategories under “other,” presumably because they were unable to estimate their costs for CEW handling.

For all of these reasons, the “other costs” category is the most variable. Table 12 provides a breakdown of recycling costs reported in the “other” category, including the percentage of reports that listed costs and the weighted average cents per pound for each subcategory.

In terms of cents per pound, the most significant subcategory was processing and disposal, at 3.7 cents per pound on a weighted-average basis (as it was in 2005, at a weighted average cost of 3.8 cents per pound). The next most significant cost was facilities and equipment rent/lease, at 2.2 cents per pound. This was also the second most costly “other cost” item in 2005, at 3.1 cents per pound.

Table 12. Breakdown of “Other Costs” for Recycling Activities

Line Item	Number of Sample Reports Listing	Percent of Sample Reports That Included Data For Each Line Item	Weighted Average Cost (Cents per Pound)
Advertising	16	67%	0.8
Processing and Disposal	23	96%	3.7
Supplies	22	92%	1.2
Depreciation	11	46%	0.6
Insurance	21	88%	1.0
Debt Service	11	46%	0.2
Fuel	14	58%	<<1.0
Maintenance	18	75%	0.3
Property Taxes	9	38%	<<0.1
Utilities	19	79%	0.3
Facilities and Equip Rent/Lease	21	88%	2.2
Security	10	42%	<< 0.1
Capital Costs ¹	<i>Excluded</i>	<i>Excluded</i>	<i>Excluded</i>
Other Additional Costs	3	13%	0.6
General Overhead	16	67%	1.6
Total	24	100%	12.6

(1) Five dual entities reported a total of \$295,965.52 in capital costs which were excluded from the operating cost analysis. It is not clear if these costs were attributable to recycling or collection activities, or both.

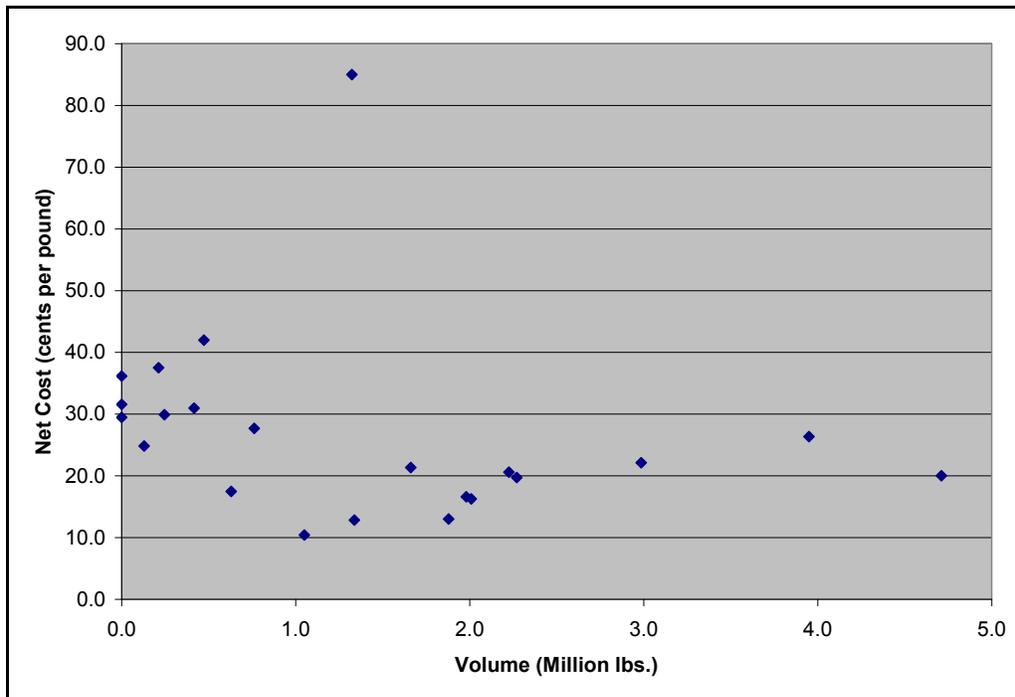
4.4 Factors Influencing Recyclers’ Net Cost per Pound

As with recovery, a number of factors influence the recycling net cost per pound. Because the effect of each factor is difficult to isolate, and because of instability in operations during the program’s first year, data from the 2005 submittal may not be sufficient to explain the effect of each factor. As additional information becomes available, a more thorough and accurate analysis of cost influences can be prepared.

4.4.1 Volume

As described in Section 4.1, it is apparent that other factors outweigh the influence of economy of scale. For example, management style, other business activities, whether the entity is involved in processing and the extent to which they are involved in processing, efficiency of operation, mergers/acquisitions, and changing partnership agreements all influence net costs.

Figure 6. Recycling Net Costs vs. Volume Handled



4.4.2 Competition for Supply and Increasing CEW Prices

Recyclers increasingly compete for access to the limited supply of CEW, causing increased net costs. In 2005, this trend was just emerging. Anecdotally, in 2005 some recyclers began to offer collectors a share of the recycling standard payment rate, over-and-above the standard recovery payment of 20 cents per pound they were obligated to pass on.

While in 2005 this trend was just beginning to emerge, with a relatively small number of supplementary payments on the order of 2 cents per pound, anecdotal evidence suggests this trend intensified in 2006, with some supplemental payments reaching as high as 10 cents per pound.

Smaller recyclers have noted that larger recyclers are better able to absorb such costs, and that this price pressure is severely hampering their ability to thrive.

4.4.3 Extent of Processing Activities and Market Value of Recovered Materials

The extent of processing activities undertaken by recyclers varies, and this directly influences operating costs and the value of materials sold on the market. Some recyclers perform minimal processing, relative to processing CRT glass and shipping materials with minimal separation, typically in Gaylord boxes or similar containers. Other recyclers do additional processing, including further separation of components, for example sorting plastic by type or color, shredding and automated separation.

4.4.4 Management Practices

As with any business, management plays a key role in the overall operation, efficiency, and profitability of recycling operations. Even firms with very similar size and business models may differ considerably in their costs and revenues, based on the experience, savvy, and general acumen of management.

As with CEW recovery operations, the organization's management practices are clearly a major cost determinant. In several cases organizations stated that they had already taken steps to reduce the relatively high costs reported in 2005, either by closing particular facilities, adjusting labor and operating procedures, or through a variety of other management practices. Included in this category is the ability of firms to take advantage of mergers and acquisitions, negotiate favorable terms with suppliers and customers, and generally to thrive in a very competitive, and still unstable, emerging electronics recycling industry.

4.4.5 Type of Organization

The vast majority of recyclers are private companies, which appear to have lower costs than government agencies. Of the 22 recycling net cost reports confirmed by the research team, 20 are private firms, one is a government agency, and one is a nonprofit entity. The weighted average net costs were 21 cents per pound for the private entities, 37 cents per pound for the governmental entity, and 85 cents per pound for the nonprofit entity. However, these net-cost-per-pound averages are from a relatively small sample, and therefore are insufficient for drawing statistically significant conclusions.

4.4.6 Changing Technologies and Design of Recovered CEW

The analysis of 2006 CEW recovery and recycling net costs is based largely on recovered CRT devices. As the number of LCD, flat screen and other technologies in the recycling stream begin to increase, costs will surely be altered significantly. However, analysis of this factor is beyond the scope of this study.

4.4.7 Rural Recycling Activities

Recyclers in rural areas face different conditions from those in more urban locations. These differing conditions may be reflected in lower volumes, higher transportation costs, different percentages of business versus residential services, lower labor and property costs, and/or other differences. A brief analysis regarding the distribution of collectors and recyclers relative to population density is provided in Appendix B.

Section 5

Trends and Considerations

This section describes issues that CIWMB may choose to consider as it evaluates potential changes to the program, including potential adjustments to standard statewide recovery and recycling payment rates.

- Section 5.1 identifies several relevant market trends.
- Section 5.2 identifies alternative approaches to rate setting.
- Section 5.3 identifies some of the potential implications of raising or lowering the standard payment rates.

5.1 Key Trends

The following California electronics recycling industry trends were identified through discussion with CIWMB staff, through the cost survey analysis, and/or through interviews with collectors, recyclers, and other stakeholders.

The California CEW recycling industry is growing steadily, in terms of the number of players and total volume handled.

Since its inception in January 2005, the number of approved collectors and recyclers, and the volume of CEW handled in the system, have grown steadily. At the end of 2005 the program included just over 300 participants (approximately 30 of which were dual entities), and by January 2007 the number of participants had grown to well over 500, including some 50 dual entities.

The volume of CEW recovered and recycled in the program grew from 65 million pounds in 2005 to over 124 million pounds in 2006.

While the number of participants is likely to level off, new participants continue to enter the program at a steady rate, and volumes continue to rise. Also, given uncertainty over the amount of so-called “legacy” waste, and the increasing promotion of the program by CIWMB and local agencies, the volume handled appears likely to continue growing at least through the next one to two years.

The California electronics recycling industry is still young and evolving rapidly; as a result, net costs may be somewhat erratic for the foreseeable future.

The onset of the California Electronics Recycling Act in January 2005 triggered rapid escalation of an already nascent industry in California. Since then, the industry has experienced rapid growth, with associated activities such as:

- Emergence of new firms and expansion of out-of-state firms into the California market place
- Mergers and acquisitions intended to grow market share and improve market positioning
- Experimentation with various recovery and recycling operational techniques, contracting and transactional terms

These trends result in a variety of one-time costs and unstable operational structures. This means that cost structures may not “settle down” to stable levels for some time.

Intense competition among recyclers is driving up prices paid to collectors.

This trend that began modestly in 2005 has intensified, based on discussions with recyclers and collectors. In an effort to secure market share, recyclers are reportedly passing on an increasing share of their standard recycling rate payment to collectors. While in 2005 this practice was just beginning, with typical pass-through amounts in the 2 to 3 cent-per-pound range, by early 2007 reports of pass-through amounts as high as 10 cents per pound have been documented.

Collectors, in turn, are increasingly negotiating for more favorable terms, and/or adopting innovative sales approaches like auctions in order to secure the most favorable deal. This may further exacerbate the trend toward mergers and acquisitions, and/or the failure of smaller and less efficient recyclers.

Some collectors are also beginning to pass through a portion of their standard payment to providers of CEW devices.

This is a newly emerging trend that is also a by-product of intense industry competition. Auctions of CEW, along with other types of electronics devices, are increasingly common. And, some collectors are paying other individuals and firms that provide CEW (with appropriate source documentation). This is especially true of corporate-generated CEW.

Many collectors and recyclers feel compelled by market competition and customer demand to handle other types of electronics waste, in addition to CEW.

There is strong evidence that the state program for covered electronic waste is also spurring recovery and recycling of a wide range of other electronic waste. Many collectors state that they must provide such services or face loss of their customer base. Several suggested that the state should include the overall cost of service for all electronics waste covered, since these materials are, in essence, part and parcel of the services provided, and collectors and processors assert that some non-CEW electronics also pose potential environmental and health hazards if managed improperly at the end of their useful life. This analysis did not consider the costs and revenues associated with electronics waste other than CEW.

Market demand and prices for recovered CEW components were relatively strong during the first two years of the program, but may become more volatile in coming years.

As in 2005, California recyclers reported no difficulty in moving electronic waste to markets. However, there is a need for market development research to ensure that viable markets remain available for CRT monitors and televisions, and for flat panel displays, especially as the latter increasingly dominate the market in coming years.

Some California processors shred recycled CEW components; however, most break CEW into streams such as the following:

- Mixed Plastics – About 56 percent of plastics used in consumer electronics is high impact polystyrene (HIPS), with the remainder a mixture of acrylonitrile butadiene styrene (ABS), poly propylene (PP), poly carbonate (PPO) and polyvinyl chloride (PVC). These may be separated by color, but are usually shipped as a mixture and find their way to buyers in the Pacific Rim.
- Wires and metals – Wires and other metal components are bundled and bagged before shipment to smelters.
- Circuit Boards – May be sold for reuse, but are commonly sold to smelters. Circuit boards from monitors typically have lower value than those from personal computers. The intrinsic

value of circuit boards (based on the metal content alone, without considering the costs to extract it) has been very high over the past two years, reaching \$3.65 per pound in May 2007.

- CRT glass – CRT glass comprises the largest percentage by weight of monitors, and is the most costly and difficult to manage.

CRT glass is sold into one of two markets.

First, it is used in a closed loop recycling application to manufacture new CRT monitors at facilities in Brazil (LG Phillips Displays), Malaysia and Korea (Samsung). While these facilities pay a small amount for CRT glass, California recyclers still see a negative value due to shipping costs. These facilities are reducing production over time as CRTs are phased out in favor of flat screen display devices. A domestic CRT glass recycler, Doe Run in Missouri, no longer provides a market for California CRT glass.

The second market for CRT glass from California is use as a flux agent in lead smelters, with the primary processor being Dlubak Glass in Arizona.

- Sale of components – Operating components such as circuit boards can represent a significant percentage of revenue in overall electronics waste recycling operations, but is less significant to CRT recycling. Since reuse of CEW is outside the California system, sale of operable monitors and televisions does not contribute to recycler revenue as calculated in this report.

No California recyclers indicated that materials marketing was a significant barrier to recycling in 2006 or 2005. Marketing was ranked last as a challenge in a recent national survey of e-waste recyclers, behind logistics/transportation costs, competition, securing volume, and cost of processing.

That said, concerns over potential problems marketing CRT glass are pervasive, as production of CRT units continues to slow and has been described as a “dying industry.” However, some speculate that sustained sales of CRTs in emerging economies such as India and China may be sufficient to provide a market for U.S.-generated waste CRTs for some time to come.

Changing technologies for monitors and televisions will ultimately alter the economics of electronics recycling, but the effects of this trend have yet to appreciably affect recovery and recycling of CEW.

Few collectors and recyclers appear to be focusing on the inevitable shift from CRT technologies to LCD and flat screen products at this time. This shift will surely impact costs and operations at fundamental levels. For at least the next one to two years, it appears likely that CRT devices will continue to dominate the CEW stream.

5.2 Alternative Approaches to Rate Setting

Every two years beginning on July 1, 2004, State statute requires CIWMB, in collaboration with the Department of Toxic Substances Control, to establish a payment schedule “to cover the net cost for an authorized collector to operate a free and convenient system for collecting, consolidating and transporting covered electronic wastes in the state,” and to “cover a recycler’s net cost to receive, process and recycle a covered electronic device from an authorized collector.”†

† California Public Resources Code, Section 42478-42479.

Because costs vary considerably for program participants due to a number of factors (as documented throughout this report), CIWMB is faced with a dilemma. No matter where the payment rate is set, some organizations' costs will be more than covered, and some will be covered less.

The issues below indicate different approaches CIWMB may adopt to address this dilemma when considering potential program adjustments to the standard statewide payment rates:

What measure should be used to set payment rates?

As discussed in Sections 3 and 4, there are several different measures derived from reported net costs that differ in subtle but important ways, for example:

- The ***weighted average*** is the overall program average, calculated by treating the program as if it were a single firm. It is calculated by dividing the total costs reported by all participating organizations by the total number of pounds of CEW handled. This measure is influenced most by the values reported by larger firms, with less weight given to smaller firms.
- The ***mean*** is calculated by averaging the reported net costs by each firm. It gives equal weight to each reported value, regardless of pounds handled or other factors. The mean can be influenced by a small number of “outliers” with very high or very low values.
- The ***median*** is the mid-point of reported values – half of all reports are below and half above the median. In contrast to the mean, it is not influenced by “outliers.”
- The ***covered percentage*** is the percentage of all participants whose costs fall below a given payment level (and therefore whose costs are covered by the payment rate).

Since only some collectors receive service-related fees for CEW, and since statute references “free and convenient” collection services, how should recovery revenue be considered when setting rates?

For example, CIWMB could choose to exclude from the analysis consideration of fees charged for CEW by drop-off programs, and or the share of private service fees charged to commercial/industrial clients that this study allocated to CEW recovery.

Should CIWMB adjust recycling payment rates, collector payment rates, or both?

CIWMB originally set the collector's standard payment rate based on estimates of the typical cost to collect CEW and to transport it to a recycler's facility. The recycling payment rate was set based on typical net costs for processing and shipment of recovered materials to market, minus market values for the materials.

Since the original rates were set, the market has changed significantly. Recyclers now almost always cover transportation costs, and as noted above, they are increasingly passing on a portion of their recycling payments to collectors, in an effort to successfully compete for access to CEW and market share. The strategy of passing funds through recyclers, in this light, appears to be successful in spurring innovation and increased recovery of CEW.

Should CIWMB establish tiered payment rates for different types of collection and/or recycling operations?

As discussed in Sections 4 and 5, different types of organizations have significantly different price structures, especially for recovery activities. For example, the costs of recovering large quantities of CEW from institutional generators in truckload amounts is far less than the cost of recovering CEW from residents.

However, in the 2006 analysis, unlike 2005, collection through permanent drop-off programs appears to be less costly on a cents-per-pound basis. This is a change from 2005, when these types of programs were more costly on a cents-per-pound basis. This may be due to:

- Changes in reporting practice (e.g., allocating costs in a different manner)
- Higher participation rates in drop-off programs, which spread costs out over a larger quantity of CEW
- Increased pass-through payments to collectors
- Increased fuel costs.

While the administrative burden would increase substantially, CIWMB could choose to set different payment rates for different types of collection and/or recycling operations.

5.3 Potential Implications of Increasing or Decreasing Rates

The implications of adjusting payment rates include:

- Increasing rates may tend to decrease the incentive to achieve greater efficiency. Program participants who receive payments in excess of profit levels they view as acceptable may choose to pass through an increasing portion of state funds to suppliers, and/or allocate a high percentage of the firm management's time and resources to gain market share, while making increasing efficiency levels a secondary priority.
- Greater payments may further promote expansion of the number of firms involved in the program and the volume handled, along with associated competitive pressures. Decreasing program payments could have the opposite impact, with volumes potentially decreasing.
- The increased volume combined with increased payment rates could potentially compromise the solvency of the fund. Conversely, reduced payment rates will help to safeguard fund solvency.
- Increasing payment rates means more program participants will have their costs covered, whereas decreasing payment rates means fewer will.
- Increasing payment rates means the gap by which program payments exceed actual costs will increase, whereas decreasing payment rates will have the opposite effect.
- Increasing payment rates may exacerbate the trend toward recyclers and collectors passing through a portion of their standard payments, whereas decreasing rates may reduce this trend.

Appendix A

2006 Net Cost Reporting Forms

Following are copies of the three standardized reporting forms provided by CIWMB and used to submit the 2006 Net Cost reports analyzed in this report. The forms include:

- Form 220 - Annual CEW Net Cost Report
- Form 220A - CEW Net Cost Estimation Worksheet for Collectors
- Form 220B - CEW Net Cost Estimation Worksheet for Recyclers

Form 220 - Annual CEW Net Cost Report

Important: Review the Guide to Net Cost Reporting in full prior to completing. Attach Net Cost Estimation Worksheets (Forms 220A for collectors and 220B for recyclers).

Line	Contact Information		
1	Organization Name		
2	CEW ID Number		
3	Type of Entity (Collector, Recycler, or Dual Entity)		
4	Affiliated Approved Collectors or Recyclers (List CEW ID and firm name, location) <i>Note: Each CEW ID must submit a separate net cost report.</i>		
5	Mailing Address (Street, City, State, Zip)		
6	Physical Address (Street, City, State, Zip) <i>If same as mailing address, enter "same."</i>		
7	Contact Person for Net Cost Report		
8	Title		
9	Phone Number for Contact Person		
10	Email Address for Contact Person		
11	Fax Number for Contact Person		
12	Date of Report Preparation		
13	Reporting Period		
	Net Cost Summary		
	Important: You must complete the Cost Estimation Worksheets (Form 220A for recovery and Form 220B for recycling) prior to filling in lines 14 - 19 below. See instructions in the Guide to Net Cost Reporting.	Recovery of CEW	Recycling of CEW
		Collectors and Dual Entities Complete	Recyclers and Dual Entities Complete
		A	B
14	Enter a check mark if you did not handle CEW in the reporting year that was subject to reimbursement through the State's Covered Electronic Waste Payment System. Skip to line 20.		
15	Total Revenues for CEW Recovery and/or Recycling <i>From Line 4A on Forms 220A (recovery) and 220B (recycling). Include only CEW-related revenues. Exclude CIWMB payments.</i>		
16	Total Costs for CEW Recovery or Recycling <i>From Line 26A on Form 220A (recovery) or Form 220B (recycling). Include only CEW-related costs. Exclude pass through of CIWMB payments to collectors.</i>		
17	Net Costs (Line 16 minus Line 15)		
18	Total Pounds of CEW Recovered and/or Recycled <i>(Note: Include only the volume for which you are eligible to receive CIWMB payments. See Instructions.)</i>		
19	Average Net Cost per Pound (Line 17 divided by Line 18)		
	Signed Declaration		
20	Printed Name and Title of Person with Signature Authority for Net Cost Reports as Designated Pursuant to Section 18660.11.		
21	Signature <i>I hereby declare under penalty of perjury that this net cost report, including any and all figures, calculations and accompanying documents has been examined by me and is true, correct and complete.</i>		
22	Date Signed		
23	City and State Signed		

Form 220A - CEW Net Cost Estimation Worksheet for Collectors			
Collectors and Dual Entities Must Complete			
Organization Name:			
CEW ID Number:			
Reporting Period:			
Date of Preparation:			
Important: Review Instructions in the Guide to Net Cost Reporting prior to completing. Briefly describe the basis for the estimates listed in Column A in Column B. For example, "Because CEW is 25% of material handled by weight, applied 25% to total insurance cost." If more space is needed, use Line 29.		Best Estimate of Itemized Revenue or Costs Specifically Dedicated to CEW Recovery	Description of Estimation Assumptions/Calculation Methods
		A	B
COSTS OF RECOVERING CEW			
Labor Costs			
1	Revenue from recyclers over and above the standard payment of 20 cents per pound required by the Act		
2	Revenue received for recovery services, such as fees charged to CEW generators		
3	Other Allowable Revenues (explain on Line 29)		
4	Total Revenue for CEW Recovery (Add lines 1 through 3. Enter on Form 220, Line 15A.)		
Transportation Costs			
5	Direct Labor		
6	Indirect Labor Allocated to CEW Handling		
7	Subtotal, Labor Costs (Add lines 5 and 6)		
8	Transportation Related to Recovery of CEW from Generators		
9	Transportation from Collector Facility to Recycler Facility		
10	Subtotal, Transportation Costs (Add lines 8 and 9)		
Other Costs			
11	Advertising, Marketing, Promotion and Public Education		
12	Processing and Disposal		
13	Supplies (Include here only supplies used in collection activities. The total cost and amount of any purchased CEW should be listed in Line 28, not on Line 13.)		
14	Depreciation (excluding transportation-related)		
15	Insurance (excluding transportation-related)		
16	Debt Service (principal and interest payments, excluding transportation-related)		
17	Maintenance (excluding transportation-related)		
18	Fuel (excluding transportation-related)		
19	Property Taxes		
20	Utilities		
Continued on Next Page			

"Other" Costs (Continued From Previous Page)																														
	Best Estimate of Itemized Costs Dedicated to CEW Recovery (A)	Description of Estimation Assumptions/Calculation Methods (B)																												
21	Facilities and Equipment Rent or Lease																													
22	Security																													
23	General Overhead																													
24	Additional Costs (Identify in line 29)																													
25	Subtotal, Other Costs (Add Lines 11 - 24)																													
26	TOTAL COSTS FOR CEW RECOVERY (Add lines 7, 10 and 25. Enter here and on Form 220, Line 16A.)																													
Additional Questions and Notes																														
27	Capital Expenditures Identify and report the amount of any capital expenditures during the reporting year, such as property, buildings, improvements, equipment or vehicles.																													
28	For the purposes of adjusting the statewide standard payment rate, what do you consider to be a "reasonable rate of profit" for private collection operations? (List in cents per pound or, if you choose, list another basis. See instructions.)																													
29	Describe below the general approach and assumptions used to estimate revenue and costs above. Also, provide any additional explanation to clarify the methods you used to estimate revenues and costs. Cite line numbers where needed. Include here the total cost and amount of any CEW which you purchased, e.g., by passing on a portion of the standard payment to suppliers of CEW. (See instructions.)																													
30	Identify below any unique costs or changes in affiliation/partnership associated with your operation during the reporting year. Attach additional sheets as needed. (For example, one-time start-up costs or the value of volunteer labor. See instructions.)																													
31	In the table below, identify the percent of total CEW you recovered from each type of source in the reporting year.	32. In the table below, identify the percent of total CEW recovered you recovered through each type of collection service.																												
	<table border="1"> <thead> <tr> <th>Source</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Residences, Individuals</td> <td></td> </tr> <tr> <td>Commercial Businesses</td> <td></td> </tr> <tr> <td>Institutional</td> <td></td> </tr> <tr> <td>Other (specify):</td> <td></td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </tbody> </table>	Source	Percent	Residences, Individuals		Commercial Businesses		Institutional		Other (specify):		Total	100%	<table border="1"> <thead> <tr> <th>Program Type</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Pick-up by Appointment (e.g., from other handlers)</td> <td></td> </tr> <tr> <td>Regularly Scheduled Pick-Up (e.g., curbside service)</td> <td></td> </tr> <tr> <td>Permanent Drop-Off Facility</td> <td></td> </tr> <tr> <td>Occasional Drop-Off Service (e.g., special events)</td> <td></td> </tr> <tr> <td>Landfill Load Check</td> <td></td> </tr> <tr> <td>Other (Specify):</td> <td></td> </tr> <tr> <td>Total</td> <td>100.00%</td> </tr> </tbody> </table>	Program Type	Percent	Pick-up by Appointment (e.g., from other handlers)		Regularly Scheduled Pick-Up (e.g., curbside service)		Permanent Drop-Off Facility		Occasional Drop-Off Service (e.g., special events)		Landfill Load Check		Other (Specify):		Total	100.00%
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Other (Specify):																														
Total	100.00%																													
33	Identify with a check mark the types of activities carried out at your facility in addition to CEW recovery.																													
	Recovery of Electronic Waste other than CEW																													
	Municipal solid waste recycling (e.g., bottles, cans, newspapers, etc.)																													
	Municipal solid waste disposal																													
	Household Hazardous Waste collection																													
	Other (specify):																													

Form 220B - CEW Net Cost Estimation Worksheet for Recyclers			
Recyclers and Dual Entities Must Complete			
Organization Name:			
CEW ID Number:			
Reporting Period:			
Date of Preparation:			
Important: Review instructions in the Guide to Net Cost Reporting prior to completing. Briefly describe the basis for the estimates listed in Column A in Column B. For example, "Because CEW is 25% of material handled by weight, applied 25% to total insurance cost." If more space is needed, use Line 29.		Best Estimate of Itemized Revenue or Costs Specifically Dedicated to CEW Recycling	Description of Estimation Assumptions/Calculation Methods
		A	B
REVENUE FROM RECYCLING CEW			
1	Revenue From Sale of Recycled CEW Components		
2	Other Allowable Revenues (explain on Line 29)		
3			
4	Total Recycling Revenue (Add Lines 1 and 2. Enter on Form 220, line 15B.)		
COSTS OF RECYCLING CEW			
Labor			
5	Direct Labor		
6	Indirect Labor Allocated to CEW Handling		
7	Subtotal, Labor Costs (Add lines 5 and 6)		
Transportation Costs			
8	Transportation from Recycling Facility to Market/Disposal Facility		
9	Other Allowable Transportation		
10	Subtotal, Transportation Costs (Add lines 8 and 9)		
Other Costs			
11	Advertising, Marketing, Promotion and Public Education		
12	Processing and Disposal		
13	Supplies (Include here only the cost of supplies needed in recycling activities. The total cost and amount of purchased CEW should be listed in Line 25, not on Line 13.)		
14	Depreciation (excluding transportation-related)		
15	Insurance (excluding transportation-related)		
16	Debt Service (principal and interest payments, excluding transportation-related)		
17	Fuel (excluding transportation-related)		
18	Maintenance (excluding transportation-related)		
19	Property Taxes		
20	Utilities		

"Other" Costs (Continued from Previous Page)			
		Best Estimate of Itemized Costs Dedicated to CEW Recycling (A)	Description of Estimation Assumptions/Calculation Methods
21	Facilities and Equipment Rent or Lease		
22	Security		
23	General Overhead		
24	Additional Costs (Identify in line 29)		
25	Subtotal, Other Costs (Add lines 11 through 24)		
26	TOTAL COSTS FOR CEW RECYCLING (Add lines 7, 10 and 25. Enter here and on Form 220, Line 15B.)		
Additional Questions and Notes			
27	Capital Expenditures Identify and report the amount of any capital expenditures during the reporting year, such as property, buildings, improvements, equipment or vehicles.		
28	For the purposes of adjusting the statewide standard payment rate, what do you consider to be a "reasonable rate of profit" for private recycling operations? (List in cents per pound or, if you choose, list another basis. See instructions.)		
29	Describe below the general approach and assumptions used to estimate revenue and costs above. Also, provide any additional explanation to clarify the methods you used to estimate revenues and costs. Cite line numbers where needed. Include here the total cost and total pounds of CEW which you purchased, e.g., by passing on a share of the recyclers standard payment to collectors. (See instructions.)		
30	Identify below any unique costs or changes in affiliation/partnership associated with your operation during the reporting year. Attach additional sheets as needed. (For example, one-time start-up costs or the value of volunteer labor. See instructions.)		

Appendix B

Analysis of the Urban-Rural Distribution of CEW Participants

Introduction

Since the inception of the California Covered Electronic Waste Payment System, one question that has arisen is whether the CIWMB should consider costs based on the geographic location of the entity. For example, some businesses state that their collection costs are higher because they conduct business in a rural area.

To the extent possible, the 2006 net cost reports were analyzed to better understand the relationship between net costs and rural location. In particular, the analysis sought to better understand the extent to which CEW program participants (e.g., collectors and recyclers) are located in rural counties. The methodology and results of this analysis are described below.

Methodology of Analysis

The CIWMB list of CEW entities provides addresses for program participants, including the county. The counties were analyzed against information obtained from The California Communities Program of the University of California. This program publishes *Quick Facts about Rural California* (“*Facts*”)[‡]. *Facts* is based on U.S. Census Bureau definitions of urban and rural, which are determined by population density and size.

According data is taken from *Facts*:

- About 50 percent of the population resides in four counties (Los Angeles, Orange, San Diego, San Bernardino)
- An additional 30 percent of the population lives in nine counties (Alameda, Santa Clara, San Mateo, San Francisco, Contra Costa, Sacramento, Ventura, Riverside, Fresno)
- Four counties can be defined as entirely rural – containing no urban population (Alpine, Mariposa, Sierra, Trinity)
- Another seven counties can be defined as predominantly “rural” – where 50 percent or more of the county population live in a rural area (Plumas, Calaveras, Modoc, Siskiyou, Amador, Lassen, Mono)
- 21 percent of the rural population live in the 14 counties that are between 30 and 49 percent rural (Tehama, Colusa, Tuolumne, Mendocino, Lake, Glenn, Nevada, Inyo, El Dorado, Madera, Del Norte, Shasta, Humboldt, Yuba)”
- Nineteen counties remain, making up the remaining category of 50 or greater urban and not part of the 13 counties having 80 percent of the California population

[‡] Available at ucce.ucdavis.edu/files/filelibrary/5089/34685.pdf

The above categories are used to categorize counties as “urban,” “mostly urban,” “somewhat urban,” “somewhat rural,” “mostly rural” and “rural” as is summarized in Table 13.

Table 13. Categories of California Counties

Category	Counties Included in Category	Number of Counties Included in Category
Urban	Los Angeles, Orange, San Diego, San Bernardino	4
Mostly Urban	Alameda, Santa Clara, San Mateo, San Francisco, Contra Costa, Sacramento, Ventura, Riverside, Fresno	9
Somewhat Urban	Calaveras, Imperial, Inyo, Kern, Kings, Mariposa, Merced, Monterey, Placer, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Solano, Sonoma, Stanislaus, Sutter, Tulare, Yolo	19
Somewhat Rural [§]	Butte, Tehama, Colusa, Tuolumne, Mendocino, Lake, Glenn, Nevada, Inyo, El Dorado, Madera, Del Norte, Shasta, Humboldt, Yuba	15
Mostly Rural	Plumas, Calaveras, Modoc, Siskiyou, Amador, Lassen, Mono	7
Rural	Alpine, Mariposa, Sierra, Trinity	4
TOTAL		58

Project staff categorized each of the CEW program participants into one of the six county categories described.

Results of Analysis

Project staff categorized each of the CEW program participants into one of the six demographic categories described above, and the results are presented in Table 14. The analysis included all counties in which participants indicated their facilities are located. It is notable that 97 percent of the volume reported by recyclers was from recyclers located in urban or mostly urban counties.

[§] Butte was excluded in error, but would be included in this category, per November 1, 2007 telephone conversation with David Campbell, director of California Communities Program and Project staff.

Table 14. Results of Analysis

Category	Collectors ¹		Recyclers ²	
	Percent of Collectors	Percent of CEW Collected	Number of Recyclers	Percent of CEW Recycled
Urban	41	43	41	35
Mostly Urban	36	38	41	62
Somewhat Urban	16	16	16	3
Somewhat Rural	5	3	2	<1
Mostly Rural	1	<1	0	0
Rural	<1	<1	0	0
TOTAL³	100	100	100	100

¹ Includes the 439 collectors that indicated county and volume collected.

² Includes the 58 recyclers that indicated county and volume recycled.

³ Sum may not equal total due to rounding.

Conclusions

- 77 percent of collectors are located in counties which comprise 80 percent of the California population.
- 81 percent of the collectors' volume is reported by collectors located in counties that comprise 80 percent of the state's population.
- However, 97 percent of recyclers are located in counties that comprise 80 percent of the California population. Consequently, recyclers are concentrated more in urban counties.

Thus, it appears that collectors and recyclers have established themselves, in general, in proportion to where they can collect CEW from the largest sectors of the population. The fact that recyclers are as likely to be located in "mostly urban" counties as opposed to "urban" counties may be due to the fact that urban real estate can cost more, and recycling facilities require a significant amount of space.

It was beyond the scope of this report to analyze cost differences between collectors located in rural counties with those located in urban counties. It is possible that collectors located in rural areas may incur higher transportation costs, due to having to transport CEW longer distances. This is one of several questions that could be explored in the analysis of the 2007 Net Cost Reports. Other possibilities include:

- Have collectors indicate their CEW county of origin (e.g., what percent originated from each county they received material from). However, this could increase the record-keeping burden.
- Analyze the popularity of program types and entity ownership (e.g., drop-off vs. pickup, and private ownership vs. municipal ownership) to identify trends in rural/urban area programs.

Note that asking recyclers to indicate the original source (county) of their CEW could result in mixed results, particularly if collectors deliver their material to more than one recycler, and collect materials from multiple counties, and/or collect non-CEW in addition to CEW.

Note also that data obtained on a county-level is inherently of limited value, as within each county there are municipalities with very different population densities. Some counties are more variable than others.

However, it should also be noted that analyzing such information in more specific terms (such as municipality of origin of CEW) would be so burdensome that obtaining valid results is unlikely.

Appendix C

Options for Improving Future Net Cost Analyses

CIWMB's system for obtaining cost data is based on a self-reporting model that ultimately relies on program participants' ability to provide accurate data in a consistent manner. While CIWMB believes the results are representative of the range of circumstances and costs experienced by California collectors and recyclers, the analysis could potentially be improved by the integration of any of several options, each of which would also add cost to CIWMB's program administration budget. Options for enhancing the net cost analysis include:

Incorporate independent on-site review or audits of report supporting documentation.

This year's analysis included review and confirmation of a sample of reports via telephone, fax and email correspondence. The analysis could be expanded to include greater review of supporting documentation on-site.

This would enhance the verification process and also provide further incentive for accuracy in submitted reports. On the other hand, on-site verification would also significantly increase the cost of the analysis for both CIWMB and respondents. Such on-site reviews could entail a thorough, but informal verification process, or could comprise a formal audit, potentially combined with consideration of other program accounting and documentation functions.

Incorporate independent time-and-motion studies.

CIWMB could adopt a net cost estimation approach similar to that used by the California Department of Conservation, Division of Recycling (the Division) in implementing the State's beverage container redemption program.

Rather than requiring self reporting of revenues and costs, the Division selects a study sample of organizations and conducts detailed, independent studies on site, including detailed review of accounting documentation and time-and-motion studies to help accurately allocate labor and other costs. Such studies would significantly increase the cost analysis exercise costs, but decrease the burden on collectors and recyclers who are not included in the study sample.

Prepare independently derived cost targets for archetypal model programs.

Rather than focusing the analysis on characterizing average or typical programs, CIWMB could focus on a small number of archetypal model programs and build reasonable cost targets for each, based on actual operating data from a sample of programs.

For example, net costs for different types of collection programs such as permanent drop-off facilities, commercial pick-up programs, and special events could be developed. While such a tiered system could help ensure that payments are expended as efficiently as possible, the administration costs would be significantly higher than the current system.

Expand the analysis of costs for non-CRT covered electronic waste.

Many program participants have commented that they feel compelled to provide broader electronics recycling services than just CEW, due to customer demand and competitive pressures. Some suggested

that a broader range of electronic waste be considered when setting payment rates so that the CIWMB standard payment rates would cover the net cost of recovering and recycling E-waste beyond CEW.

Future cost reporting and analyses could seek to capture additional information on a broader range of electronic waste recycling activities. If all electronic waste were covered, more accurate reporting would likely result as collectors and recyclers would not have to estimate the portion of electronic waste that is “covered.”

Analyze how changes in technologies will impact CEW recovery and recycling in coming years.

Given rapid changes in sales of new consumer electronic products with technologies such as LCD and flat screen panels, it is generally accepted that the composition of the stream of recovered CEW will change significantly in coming years.

However, beyond anecdotal projections, there appears to be a dearth of reliable information to help CIWMB and program participants to plan, or to project how the shift in technologies may impact the economic, technological, and market functioning of the program. CIWMB could analyze new technology trends to identify potential barriers and opportunities to ensure a successful program well into the future.