Evaluation of 2023 Net Cost Report Information

Overview

The following tables and discussion are a summary of the evaluation of "as-reported" 2023 data contained in the 2023 Net Cost Reports, submitted pursuant to Title 14 of the California Code of Regulations (CCR), Section 18660.10, pertaining to the management of covered electronic waste (CEW). This evaluation was performed by staff of the CalRecycle CEW Recycling Program.

In general, the tables in this attachment show the reported net costs per pound of recovery and recycling cathode ray tube (CRT) CEW and non-CRT CEW among program participants when the as-reported costs are examined, revealing weighted average, mean, and median costs. They also show the percentage of participating organizations that reported costs lower than the current standard payment rates ($0.35 cents per pound recovery rate, the $0.63 cents per pound CRT CEW recycling portion and the $0.75 cents per pound non-CRT CEW recycling portion) within selected segments of participants. Figures based on the available Net Cost data appear in the tables below. The data is presented in cents per pound unless otherwise noted.

Analysis of All Net Cost Reports

Program staff compiled "as-reported" 2023 data and examined it in a variety of ways to gain insights into industry costs and inform CEW payment rate considerations. Wide variations in costs were reported by both collectors and recyclers. This is to be expected due to the range of business practices and operational scales within the industry. It is also certain that there are errors contained in the reported costs and revenues in some Net Cost Reports, as evidenced by some reports asserting recovery costs of several dollars per pound. To compensate for the likelihood of extreme instances of faulty data affecting calculated industry averages, program staff excluded outlier reports statistically by determining the quartiles and interquartile range (IQR) of each data set, setting an upper and lower limit of data points by using the standard 1.5 x the IQR, and eliminating any reports with a Net Cost that falls outside of the given range.

The following tables include:

1. Analysis of submitted 2023 Net Cost Recycling Reports
2. Analysis of submitted 2023 Net Cost Recovery Reports
3. Analysis of 2023 Net Cost Recycling Reports from "larger" operations contributing the "top" 50 percent of handled CEW
4. Analysis of 2023 Net Cost Recovery Reports from "larger" operations contributing the "top" 50 percent of handled CEW
5. Analysis of 2023 Net Cost Recycling Reports from "small" operations contributing the "bottom" 50 percent of handled CEW
6. Analysis of 2023 Net Cost Recovery Reports from "small" operations contributing the "bottom" 50 percent of handled CEW
7. Comparison of calculated Weighted Average Net Costs 2005 – 2017
8. Comparison of calculated Weighted Average Net Costs of CRT CEW and non-CRT CEW 2017-23

Tables 1 and 2 below show the analysis of as-reported 2023 net costs for recycling and recovery, respectively, of CEW using reports submitted by CEW Recycling Program participants but excluding "outlier" reports that cited net costs that fell outside of 1.5 times the interquartile range of the data set. Of the 281 submitted recovery reports for collection, 39 collector reports were excluded because they

reported recovery costs that were outliers. Not all recyclers cancel both CRT and Non-CRT CEW. Of the 19 recycling reports CalRecycle received, 14 supplied CRT recycling data and 18 supplied non-CRT data.

The data reveal that the reported net costs of collectors and recyclers reached an all-time high in 2023, but due to the payment increases across all categories in 2023, CalRecycle payments covered that difference for the majority of collectors and recyclers. An examination of the percentage of recycling reports whose weighted average net cost was smaller than or equal to the corresponding standard payment rates in Table 1 shows that the payment rates for non-CRT CEW covered the reported costs for 69% of CRT recyclers and 78% of non-CRT recyclers. For collectors, 55% reported a net cost at or below the standard payment rate.

Table 1: Analysis of Submitted 2023 Net Cost Recycling Reports

CRT Weighted Average*	CRT Mean	CRT Median	% of Reports < or = Std Pay Rate	Non-CRT Weighted Average	Non-CRT Mean	Non-CRT Median	% of Reports < or = Std Pay Rate
$0.51	$0.56	$0.56	69%	$0.53	$0.56	$0.57	78%

** The weighted average reflects the overall industry cost per pound, calculated as if the industry operated as a single organization; i.e., by dividing the collective reported costs and revenues (total net cost) by total pounds recovered and/or recycled by all participants in the study sample.*

Table 2: Analysis of Submitted 2023 Net Cost Recovery Reports

CEW Weighted Average	CEW Mean	CEW Median	% of Reports < or = Std Pay Rate
$0.36	$0.35	$0.32	55%

A "50/50" Evaluation

The above calculations are only one perspective on how to view the data. The following four tables compare the reported net costs by two different sets of participating organizations, each one having handled approximately half of the total amount of CEW recovered or recycled in 2023. The totality of reporting entities were ranked in order of their reported volume of CEW throughput, and then contributing volume was divided roughly in half, assigning a volume to the "larger" contributors and, separately, the "smaller" operations. The terms "larger" and "smaller" are admittedly relative within the context of the overall CEW management industry, with some of the assigned "smaller" entities being substantially larger than the smallest participants.

Tables 3 and 4 below show the analysis of as-reported 2023 net costs for recycling and recovery respectively for CEW by those "larger" operations whose combined handling accounted for approximately 50% of the total CEW handled. This represents approximately 7% of all reporting collectors, 22% of all reporting non-CRT recyclers, and 29% of reporting CRT recyclers.

Table 3: Analysis of 2023 Net Cost Recycling Reports ("large" operations representing top ~50% of CEW)

CRT Weighted Average	CRT Mean	CRT Median	% of Reports < or = Std Pay Rate	Non-CRT Weighted Average	Non-CRT Mean	Non-CRT Median	% of Reports < or = Std Pay Rate
$0.43	$0.44	$0.45	100%	$0.46	$0.48	$0.53	100%

Table 4: Analysis of 2023 Net Cost Recovery Reports ("large" operations representing top ~50% of CEW)

CEW Weighted Average	CEW Mean	CEW Median	% of Reports < or = Std Pay Rate
$0.40	$0.41	$0.42	18%

This perspective shows net costs for recovery reported by the larger volume collectors as being higher than the industry average. While the net cost for recovery is slightly less than the existing recovery payment rate when analyzed as a weighted average, it is slightly more when analyzed by the mean.

The sampling of larger volume recyclers' net cost calculations resulted in a weighted average which is $0.08 and $0.07 cents per pound less for CRT CEW and non-CRT CEW, respectively, as compared to all recyclers. The weighted average, mean, and median costs are all well below the current recycling portion of the payment rate. The percentage of the larger volume recyclers in this segment whose individual reported costs are covered by the recycling portion of the current payment rate is 100% for CRT CEW and for non-CRT CEW. While representing a small sample size, this suggests that a small number of higher-volume, low-cost operations may be bending the overall cost curve disproportionally downward for the industry as a whole.

Tables 5 and 6 below show the analysis of as-reported 2023 net costs for recycling and recovery, respectively, CEW by those "smaller" operations whose combined handling accounted for approximately 50% of the total CEW handled. This represents approximately 93% of all reporting collectors, 78% of non-CRT CEW reporting recyclers, and 71% of CRT CEW reporting recyclers.

Table 5: Analysis of 2023 Net Cost Recycling Reports ("small" operations representing bottom ~50% of CEW)

CRT Weighted Average	CRT Mean	CRT Median	% of Reports < or = Std Pay Rate	Non-CRT Weighted Average	Non-CRT Mean	Non-CRT Median	% of Reports < or = Std Pay Rate
$0.59	$0.62	$0.60	56%	$0.60	$0.58	$0.60	79%

Table 6: Analysis of 2023 Net Cost Recycling Reports ("small" operations representing bottom ~50% of CEW)

CEW Weighted Average	CEW Mean	CEW Median	% of Reports < or = Std Pay Rate
$0.32	$0.35	$0.30	58%

This perspective shows that the net costs for recovery reported by the smaller volume collectors are $0.04 cents per pound less than the recovery payment rate for all collectors, when analyzed as a weighted average, and $0.08 cents per pound less than recovery cost reported by the large collectors.

The practice of purchasing CEW from third-party handlers may be contributing to the apparently higher costs for some of these larger operations. However, other factors may be in play, and it is difficult to further ascertain which ones are applicable to individual businesses.

While the smaller volume collectors are more efficient than the large, the opposite is true regarding recycling. Comparing the net costs on Tables 3 and 5 shows that CRT recycling costs $0.16 cents more per pound, and non-CRT cost $0.14 cents more per pound, for the small recyclers. The percentage of the smaller volume recyclers whose individual reported costs are covered by the recycling portion of the current payment rate for this sampling decreased significantly to 56% for CRT CEW and 79% for non-CRT CEW.

Historic Perspective

Table 7 below compares the calculated weighted average net costs for CEW recovery and recycling before the recycling portion was split into CRT CEW and non-CRT CEW. This data was reported over the life of the program for all included participants, but excludes outlier reports that cited net costs for recovery or recycling in excess of $1 per pound profit or loss. Beginning in 2021, CalRecycle used the statistical method known as Interquartile Range to exclude individual outlier collection and recycling reports with net costs significantly different from the mean. The small increase in the combined weighted average net costs from 2015 appears primarily due to increases in reported recovery costs, but there was also a slightly more than half a cent rise in the nest cost of recycling. The data from the 2016 reporting cycle, which was a year when the rates were not adjusted, showed that both categories saw decreases in the reported net costs. The full breadth of factors behind these fluctuations are unclear, but other data suggest recovery cost increases were due in part to charges by recyclers to cover processing costs of non-CRT CEW and, in particular, payments to handlers and transporters.

Table 8 below compares the calculated weighted average net costs for CEW recovery, as well as the separate non-CRT CEW and CRT CEW recycling costs, as reported from 2017-2021. The 2017 split recycling data was from thirteen CRT recyclers and seven non-CRT recyclers that voluntarily reported, which is why the 2017 data is on both tables. Analysis of the collection data shows that the net cost of collection has risen steadily since 2017. The cost of CRT and non-CRT recycling dropped in 2018. A possible explanation for this was errors in the report of one large recycler, and missing data on the report of another large recycler. The 2019 costs for recovery and recycling activities rose beyond the 2017 totals and has continued to rise year after year.

Table 7: Comparison of Calculated Weighted Average Costs 2005-2017

Category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Recovery	17.1	16.7	14.8	16.6	14.4	15.3	15.2	17.1	16.8	17.2	17.6	16.3	20
Recycling	25.2	21.5	21.0	22.8	18.7	18.1	19.2	17.8	23.8	23.5	26.8	24.9	26.9
Combined	42.3	38.2	35.8	39.4	33.1	33.4	34.4	34.9	40.6	40.7	44.4	41.2	46.9

Table 8: Comparison of Weighted Average Net Costs 2017-23

Year	Recovery	Recycling CRT	Combined CRT	Recycling Non-CRT	Combined Non-CRT
2017	20	24.3	**44.2**	38.1	**58.1**
2018	21.2	19.5	**40.7**	35.9	**57.1**
2019	22.3	27.7	**50**	40.6	**62.9**
2020	25.4	30.2	**55.6**	43.2	**68.6**
2021	28.9	34.9	**63.8**	45.5	**73.9**
2022	30.4	43.3	**73.7**	48.8	**79.2**
2023	35.8	51.2	**87.0**	52.6	**88.4**

Conclusion

Based on the 2023 calculated weighted average net costs per pound to recover and recycle CEW in California, as well as additional factors that affect the markets such as increased labor costs, and estimated reasonable rate of profit or return on investment, staff of the CalRecycle CEW Recycling Program suggest that another adjustment in the standardized statewide recovery rate for all CEW and the recycling portion of the combined recovery and recycling CRT CEW payment rate is warranted.