State of US E-Waste 2026

A data study of US electronics recycling: capacity, compliance, economics

May 2026

Published by eCycling Central · Defining Style Limited
ICO ZA711914 · CC-BY 4.0 licensed dataset

Contents

Key Findings

Key Findings - State of US E-Waste 2026

Five quotable sound-bite stats with attribution. Lift verbatim for press release, Twitter cards, and outreach emails. v2 release: stats 1, 4, and 5 corrected after external fact-check review; stats 2 and 3 unchanged from v1.

1. “The United States recycled 1.04 million short tons of consumer electronics in 2018, a 38.5% recycling rate, sitting 60.5 points below the country’s 99.0% rate on lead-acid batteries.” - EPA SMM 2018 Durable Goods product-specific data, published 2023
2. “Federal NAICS 562 waste-management and remediation contracts totalled $6.98 billion in FY2024 across 49 states, with South Carolina absorbing $1.10 billion of that on the strength of Department of Energy legacy-cleanup work at the Savannah River Site.” - USAspending.gov v2 API
3. “eCycling Central’s first audit of EPA RCRA-registered electronics recyclers found 51.6% of audited facilities (16 of 31, across 18 states) maintain a clean Significant Non-Compliance record on their current EPA ECHO Detailed Facility Report.” - EPA ECHO
4. “Current US consumer-electronics recycling avoids 821,600 metric tons of CO2-equivalent emissions per year, equal to taking 178,609 passenger cars off the road for a year.” - EPA WARM v15 Electronics chapter, Exhibit 1-23 × EPA SMM 2018
5. “Of 21 CPSC recalls confirmed across 15 of 87 tracked consumer-electronics brands, 15 (71.4%) cite fire or overheating as the primary hazard, with lithium-ion battery failure the dominant underlying failure mode.” - US Consumer Product Safety Commission

Section 1: The US E-Waste National Picture

The United States generated 2.7 million short tons of selected consumer electronics in 2018 and recycled 1.04 million of them, for a 38.5% recycling rate (EPA SMM 2018, Durable Goods: Product-Specific Data, published 2023). That rate sits 6.4 points above the 32.1% recycling rate for all US municipal solid waste, and 60.5 points below the 99.0% rate the country achieves on lead-acid car batteries. The federal cadence stops there. The EPA has not refreshed national volumes since 2018, so the rest of this report drills into geographies, facilities, and recoverable materials that the federal release does not break out.

What the EPA's latest national release actually says

The EPA's Sustainable Materials Management 2018 figures, published in November 2023, are the most recent nationwide volumes available. The agency reports the country produced 292.4 million tons of total municipal solid waste, of which 32.1% was recycled, 11.8% combusted with energy recovery, and 50.0% landfilled. Within that, the selected consumer electronics category (covering TVs, monitors, desktops, laptops, peripherals, mobile devices, hard-copy peripherals, and small consumer audio-visual gear) accounted for 2,700,000 short tons of generation and 1,040,000 short tons of recovery (EPA SMM 2018 Durable Goods product-specific data).

The 38.5% selected-electronics rate is modestly higher than the 32.1% headline for MSW as a whole. That gap is small but real: electronics outperform paper, plastic, food waste, and yard trimmings when measured on a percentage-recovered basis, but only by 6.4 points. The gap exists because 25 of 50 US states have enacted mandatory e-waste laws (see Section 7) that route covered devices through manufacturer-funded collection programs. In the other 25 states, consumer electronics fall under standard MSW rules and most of the device stream ends up landfilled with the rest of household waste.

This v2 release of the report corrects a v1 number that read 1.17 million short tons / 43.3%. The correct figures, verified directly against EPA's Durable Goods product-specific data table (Selected Consumer Electronics row, generation and recycling columns for 2018), are 1.04 million short tons / 38.5%. The 2.7 million short tons of generation was right in v1 and stays the same here.

Why consumer electronics sit at 38.5% but lead-acid batteries sit at 99.0%

The same EPA SMM 2018 release records a 99.0% recycling rate for lead-acid batteries, the highest of any product category the agency tracks. Three structural differences explain the 60.5-point gap. First, lead-acid battery recycling is mandated at the federal level under RCRA Subtitle C universal

waste rules and reinforced by every US state, while consumer electronics rules vary state by state and 25 states impose no mandate at all. Second, retailers who sell new car batteries are required to accept old ones for trade-in under state core-charge schemes (typically $5 to $20 per battery) which converts the disposal step into a refund on the next purchase. Third, the secondary lead market values a single battery at $8 to $15 in scrap, while the analogous figure for a smartphone is $2.69 (see Section 4 of this report). Strong policy plus a strong scrap price plus a built-in take-back retail loop produces a 99.0% recovery rate. Consumer electronics have weaker policy coverage, lower per-unit scrap value for most devices, and no nationwide retail take-back equivalent.

The contrast tells US recyclers and policymakers exactly which levers move recovery rates. The EPA WARM v15 Electronics chapter emission factor for mixed electronics (used in Section 6 of this report) confirms the climate dividend from closing the gap would be material: every additional 1.0 million short tons of consumer electronics diverted from landfill avoids roughly 790,000 metric tons of CO2-equivalent, equal to roughly 171,700 passenger cars off the road for a year (EPA WARM v15 Electronics chapter, Exhibit 1-23).

How the headline number stacks against other waste streams

To frame the 1.04 million short tons of recovered consumer electronics against the rest of the 2018 release: total US MSW recycling was 69.0 million tons, paper and paperboard hit 46.0 million tons recycled at a 68.2% rate, glass recycling reached 3.1 million tons at 31.3%, and yard trimmings reached 22.3 million tons at 63.0%. Consumer electronics at 1.04 million tons are a small fraction of total recycling tonnage but punch above their weight on three measures: dollar value of recoverable material per ton, climate impact per ton recycled, and toxicity risk per ton landfilled. EPA WARM v15 assigns mixed electronics a -0.79 MTCO2e factor per short ton recycled, modestly higher in absolute value than the factor for mixed MSW and broadly comparable to office paper.

Why this section uses 2018 data in a 2026 report

The 2018 figure is the latest year the EPA has published. The agency's SMM release runs on a four-to-five-year lag because it reconciles state-reported data with industry shipment data, then runs a multi-source materials-flow model. The 2018 numbers were published in November 2023. The next national release covering 2022 data is expected in 2027 or 2028 according to the EPA's stated cadence. For 2026 reporting, the responsible practice is to cite the 2018 figure as "the latest national data available" rather than infer 2026 tonnage from secondary sources that lack the EPA's modelling rigour. The state-level recycler density in Section 2, the metro-level employment in Section 3, and the live commodity-price scrap values in Section 4 of this report all use 2023 or 2024 data, which is the most recent vintage we can responsibly cite for each layer.

What the federal release does not break down

The EPA SMM 2018 release reports a single national tonnage figure for selected consumer electronics. EPA SMM 2018 does not split the number by state, by metro, by device category within electronics, or by facility. Three federal data sets fill those gaps: the EPA RCRA registry and EPA ECHO compliance reports (Section 5) cover individual facilities; the BLS Quarterly Census of Employment and Wages NAICS 562 series (Section 3) covers state and metro recycling-industry employment and wages; and USAspending.gov's NAICS 562 contract data (folded into Section 2) covers federal recycling and remediation contracts by state. The remaining sections of this report stitch those federal sources together with state legislation status, CPSC recall data, LME commodity prices, and the eCycling Central recycler directory to produce the geographic, economic, and compliance picture the EPA's single national figure does not.

Source for every figure cited here: EPA SMM 2018, Durable Goods: Product-Specific Data, Selected Consumer Electronics row, published November 2023, epa.gov/facts-and-figures-about-materials-waste-and-recycling/durable-goods-product-specific-data.

Section 2: State-by-State Capacity Ranking

Vermont leads the United States with 5.89 published recyclers per 100,000 residents and Texas trails at 0.45 per 100,000, a 13x gap measured against the eCycling Central directory and US Census ACS 2023 population data (Census Bureau ACS 5-year). Looking only at density obscures a second story: federal NAICS 562 contract spending ran to $6.98 billion across all 50 states and the District of Columbia in FY2024, with South Carolina absorbing $1.10 billion of that on the strength of Department of Energy legacy-waste cleanup work at the Savannah River Site (USAspending.gov v2). Recycler-per-capita, recycling-industry employment, and federal contract obligations point at three very different state rankings, and recyclers, journalists, and policymakers reading this report need to see all three.

Which states have the most recyclers per resident

The top 10 states by recycler density are dominated by low-population New England and Mountain states where 30 to 50 directory entries divide into populations under 1.4 million to produce ratios well above the 1.0-per-100,000 national median. This is partly a real accessibility advantage (Vermont mandates drop-off within 15 miles of every resident under the 2010 Vermont Electronics Recycling Law, 10 VSA Chapter 166) and partly a mathematical artifact of small populations.

Rank	State	Recyclers per 100k	Recycler count	Population
1	Vermont	5.89	38	645,254
2	New Hampshire	3.82	53	1,387,834
3	District of Columbia	3.27	22	672,079
4	Delaware	3.18	32	1,005,872
5	Wyoming	3.10	18	579,761
6	Maine	2.61	36	1,377,400
7	Montana	2.44	27	1,105,072
8	North Dakota	2.44	19	779,361
9	Rhode Island	2.37	26	1,095,371
10	Alaska	2.18	16	733,971

Source: eCycling Central legacy_recyclers directory cross-referenced to US Census ACS 2023 5-year population estimates.

The small-population artifact is real and we flag it openly. A more useful comparison for state-level policy is the absolute count: California's 362 recyclers, Florida's 217, and Texas's 134 dwarf Vermont's 38 in raw infrastructure terms, though those three states sit at 0.92, 0.99, and 0.45 per 100,000 respectively because their populations are 39.2 million, 21.9 million, and 29.6 million (US Census ACS 2023).

Which states have the fewest recyclers per resident

The bottom 10 are dominated by high-population Southern states plus the Industrial Midwest. Texas, with the largest population and a 0.45 ratio, faces the steepest accessibility gap: 29.6 million Texans share 134 recyclers, roughly one facility per 221,000 residents. Tennessee at 0.47 per 100,000 is structurally similar.

Rank	State	Recyclers per 100k	Recycler count	Population
50	Texas	0.45	134	29,640,343
49	Tennessee	0.47	33	6,986,082
48	Michigan	0.53	53	10,051,595
47	Pennsylvania	0.54	70	12,986,518
46	New York	0.55	109	19,872,319
45	Mississippi	0.61	18	2,951,438
44	Louisiana	0.61	28	4,621,025
43	North Carolina	0.62	66	10,584,340
42	Kentucky	0.62	28	4,510,725
41	Ohio	0.64	75	11,780,046

Four of these 10 bottom-density states (Mississippi, Louisiana, Tennessee, Kentucky) have no mandatory state e-waste law in our Section 7 legislation register. North Carolina is the exception in the bottom group: it does have the Discarded Computer Equipment Management Act (enacted 2007), but its 0.62 recyclers per 100,000 sits near the bottom anyway, suggesting policy alone is necessary but not sufficient for capacity build-out. The broader pattern in the no-law states is consistent with supply and demand: without policy mandating manufacturer-funded collection, fewer recyclers find the unit economics workable.

What state-level recycling-industry employment looks like

The Bureau of Labor Statistics' Quarterly Census of Employment and Wages reports total NAICS 562 (Waste Management and Remediation Services) employment for each state as a 2024 annual average (BLS QCEW). NAICS 562 covers the broader waste management industry, not e-waste exclusively, but it is the federal series that most cleanly captures the workforce that processes used electronics alongside other waste streams.

Rank	State	Employment	Establishments	Avg annual pay
1	California	60,483	3,060	$86,752
2	Texas	45,765	2,876	$78,066
3	Florida	33,006	2,580	$71,882
4	New York State	23,928	1,751	$79,932
5	Pennsylvania	20,640	1,474	$77,232
6	Illinois	16,324	1,048	$93,824

Source: BLS QCEW 2024 NAICS 562 annual averages.

California's 60,483 workers earning a $86,752 mean annual wage is the country's largest concentrated recycling workforce and the highest payroll spend among the top 5 states. Illinois's $93,824 mean wage tops the table at the state level, $15,758 above Florida's $71,882, a gap that reflects Chicago metro unionisation rates and facility-scale effects (Section 3 of this report drills into the per-metro wage variation in detail).

Where federal recycling contracts flow

The third state ranking comes from USAspending.gov's spending_by_geography API on NAICS code 562 for fiscal year 2024. All 50 states plus the District of Columbia received a total of $6.98 billion in federal obligations against waste-management and remediation contracts.

Rank	State	FY2024 NAICS 562 obligations
1	South Carolina	$1,104,908,947
2	Tennessee	$785,634,649
3	Washington	$743,968,335
4	Ohio	$622,885,016

Rank	State	FY2024 NAICS 562 obligations
5	Idaho	$535,759,763
6	California	$430,486,878
7	North Carolina	$361,584,870
8	New York	$253,090,993
9	New Jersey	$195,207,877
10	Texas	$164,391,293

Source: USAspending.gov v2 spending_by_geography API, NAICS 562, FY2024.

South Carolina's $1.10 billion leads the country by $319 million over second-place Tennessee. The cause is not consumer e-waste recycling. The dominant share of South Carolina's NAICS 562 obligations is contract activity around the Department of Energy's Savannah River Site near Aiken, a 310-square-mile federal nuclear and chemical legacy cleanup property where DOE has run an Environmental Management programme since 1989. Tennessee's $786 million is similarly weighted by DOE Oak Ridge cleanup, Washington's $744 million by the DOE Hanford Site, Ohio's $623 million by DOE Mound and Fernald legacy sites, and Idaho's $536 million by the Idaho National Laboratory. The pattern holds: roughly half of the top 10 NAICS 562 federal-contract states are DOE legacy cleanup locations rather than consumer recycling hubs. For e-waste reporters, that is the headline: when federal procurement data is read at face value as "recycling spending," it materially overstates consumer-electronics activity and understates the policy-driven role of state mandates (Section 7).

How to read the three rankings together

The three rankings rarely agree. California ranks 39th by recycler density (0.92 per 100,000), first by NAICS 562 employment (60,483 workers), and sixth by federal contract dollars ($430 million). Vermont ranks 1st by density (5.89 per 100,000), is excluded from the top 10 employment table for scale reasons, and ranks 45th by contracts ($4.5 million). South Carolina ranks 26th by density (1.25 per 100,000), is excluded from the top 6 employment table, and tops the federal contract ranking by $319 million. The takeaway: a state can have many small consumer recyclers and few federal dollars (Vermont), many large industrial waste facilities and modest consumer access (California), or a single massive federal cleanup site that dominates its NAICS 562 line item (South Carolina). Each ranking answers a different question.

Methodology and sources

Recycler counts pull from eCycling Central's `legacy_recyclers` directory, geo-verified and de-duplicated. Population data uses the US Census Bureau ACS 5-year 2023 release. Density = recycler count divided by population, expressed per 100,000. State-level employment, establishments, and wages come from BLS QCEW 2024 annual averages on NAICS 562. Federal contract obligations come from USAspending.gov v2 spending_by_geography API, filtered to NAICS 562 (Waste Management and Remediation Services) and FY2024 (October 2023 to September 2024), award types A through D (definitive and IDV). All 50 states + DC return non-zero values in the current extraction; the $6.98 billion total covers every US jurisdiction.

Section 3: The 47-Metro Deep-Dive

The Bureau of Labor Statistics' Quarterly Census of Employment and Wages reports NAICS 562 industry data for 47 US metro and state areas with usable 2024 annual averages, and the spread is wider than the state rollups suggest. The St Louis metro pays $106,635 mean annual pay against Tampa's $62,724, a $43,911 difference. Possible explanations include facility scale, unionisation, and the mix of remediation vs collection work in each metro (BLS QCEW); we examine each below. Seventeen US metros - Houston, Chicago, Boston, Dallas, Fort Worth, Atlanta, Detroit, Philadelphia, Indianapolis, Denver, Memphis, Nashville, Austin, Washington DC, Louisville, Cincinnati, San Antonio - return zero employment figures because BLS suppresses values when sample sizes risk identifying individual employers.

Where the country's recycling-industry workforce concentrates

NAICS 562 employment is heavily clustered at the state level - California alone has 60,483 workers (Section 2 of this report covers state-level totals). Inside states, the metro-level pattern shows New York City and the Los Angeles-Long Beach-Anaheim CBSA leading the metro list. The BLS series reports a single shared employment figure of 19,234 for the Los Angeles and Long Beach city entries because both fall inside the same CBSA (FIPS C3108); we treat them as one metro in this analysis.

Rank	Metro	NAICS 562 employment	Establishments	Avg weekly wage	Avg annual pay
1	New York City	23,649	1,525	$1,595	$82,936
2	Los Angeles-Long Beach CBSA	19,234	896	$1,667	$86,689
3	St Louis	9,947	370	$2,051	$106,635
4	Miami	8,312	576	$1,648	$85,676
5	Phoenix-Mesa CBSA	7,400	433	$1,467	$76,294
6	Seattle	6,936	386	$1,670	$86,834
7	Tampa	6,345	360	$1,206	$62,724
8	San Diego	4,505	242	$1,690	$87,880

Rank	Metro	NAICS 562 employment	Establishments	Avg weekly wage	Avg annual pay
9	Orlando	3,885	285	$1,296	$67,415
10	Las Vegas	3,771	153	$1,394	$72,474

Source: BLS QCEW 2024 NAICS 562 annual averages by Metropolitan Statistical Area. Phoenix and Mesa share CBSA C3806; Los Angeles and Long Beach share CBSA C3108.

New York City's 23,649 workers across 1,525 establishments average $82,936 in annual pay. The Los Angeles-Long Beach CBSA's 19,234 workers across 896 establishments average $86,689, $3,753 higher than New York despite roughly the same establishment density per worker (21.5 workers per establishment in LA-Long Beach vs 15.5 in New York City). St Louis is the structural outlier: 9,947 workers across 370 establishments is a 26.9-worker-per-establishment ratio, the highest of any top-10 metro, which is consistent with the metro being a Midwest hub for large industrial waste-processing facilities rather than dispersed urban collection operations.

Why St Louis pays $106,635 and Tampa pays $62,724

The wage gap between St Louis and Tampa is $43,911 per year, or a 70.0% premium. Three factors drive it. First, facility scale: St Louis's 26.9 workers per establishment is more than 1.5x Tampa's 17.6, and larger facilities pay higher mean wages because they need senior plant operators, hazardous-materials technicians, and unionised processing crew. Second, the industry mix: St Louis's NAICS 562 base is weighted toward heavy industrial remediation work (the metro hosts a long historical chemicals and metals processing corridor along the Mississippi), while Tampa's base is weighted toward municipal collection and transfer. Third, unionisation: Missouri is a non-right-to-work state with above-median Teamsters Local 688 presence in waste collection, while Florida is right-to-work with lower union density. A similar pattern appears at the smaller scale: Phoenix-Mesa CBSA pays $76,294, $10,395 below Los Angeles-Long Beach's $86,689, and the Phoenix metro has a more dispersed collection-heavy industry mix vs LA-Long Beach's combination of Port of Long Beach remediation work and large industrial recyclers.

What the 17 zero-employment metros mean

BLS QCEW suppresses employment data for any geography where the count of establishments is small enough that individual employers could be identified. The 17 US metros with zero employment in our dataset (Houston, Chicago, Boston, Dallas, Fort Worth, Atlanta, Detroit, Philadelphia, Indianapolis, Denver, Memphis, Nashville, Austin, Washington DC, Louisville, Cincinnati, San Antonio) are not metros with zero recyclers. They are metros where BLS's disclosure rules suppress the figure. The establishment count is still reported - Houston has 692,

Chicago has 642, Atlanta has 676, Philadelphia has 584 - so we know the workforce exists. We cannot publish dollar wages or worker counts for those metros without inferring against BLS disclosure rules. For a fuller picture, the state-level table in Section 2 captures these workforces inside the relevant state totals: Texas's 45,765 workers include Houston, Dallas, Austin, San Antonio, and Fort Worth; Illinois's 16,324 include Chicago; Pennsylvania's 20,640 include Philadelphia.

How metro recycler density compares to metro employment

Eleven of the 47 reporting metros have usable employment data; the other 20 metros with non-zero figures are smaller markets (Anchorage 938 workers, Charlotte 319, Sacramento 3,357, San Jose 3,714). Anchorage's 938 workers across 86 establishments produces a 10.9-worker-per-establishment ratio, the lowest of any reporting metro - which is consistent with Alaska's geography (Alaska has 16 recyclers serving 733,971 residents per our state-level data, the highest density-per-capita ranking in the country for a state of its size).

Charlotte's 319 NAICS 562 workers in a metro of 874,579 residents is the lowest worker-to-population ratio of any city we have employment data for. The Charlotte metro has 18 establishments, producing 17.7 workers per establishment - close to the national mean - so the gap is in establishment count, not facility size. North Carolina ranked 43rd nationally on the recyclers-per-100k metric in Section 2 (0.62 per 100,000), and the BLS data confirms the same picture from the employment side: the state's recycling industry is underbuilt relative to its 10.6 million residents.

What the BLS metro data does not capture

Three caveats are worth flagging. First, NAICS 562 is the federal industry classification for "Waste Management and Remediation Services," which includes solid waste collection, hazardous waste treatment, and remediation activities; e-waste is a subset of this code, not a standalone code, so the workforce numbers include workers handling municipal waste, sewage sludge, and other streams alongside used electronics. Second, the disclosure-suppression issue described above hides ~34% of US metros from this analysis. Third, BLS reports annual averages - quarterly variation, seasonal hiring, and contract-worker spikes around large facility decommissioning projects are smoothed over.

What the data does capture cleanly: where the industry's payroll is largest (New York City, Los Angeles-Long Beach), where the highest mean wages are paid (St Louis, San Diego, Seattle), and where facility scale is largest (St Louis, again). For policymakers debating state e-waste expansion, the BLS table is the cleanest federal series showing which regional labour markets already have the workforce depth to absorb additional collection mandates and which would need to build the workforce alongside the policy.

Methodology and source

All metro data pulls from the Bureau of Labor Statistics Quarterly Census of Employment and Wages 2024 annual averages, NAICS industry code 562, by Core-Based Statistical Area FIPS where available and by state where CBSA aggregation is not published. Metros sharing a CBSA (Los Angeles-Long Beach, Phoenix-Mesa, Minneapolis-St Paul) are reported once. Metros where BLS suppressed values due to small-sample disclosure rules are kept in the 47-metro count but excluded from the dollar-wage tables. Annual pay is calculated by BLS as average weekly wage multiplied by 52. Source: data.bls.gov/cew/apps/data_views/data_views.htm.

Section 4: The Economics of Recovery

Servers and network equipment top the per-unit scrap recovery table at $55.58 of recoverable metal value per discarded device, against $0.01 for an ink cartridge at the bottom - a 5,558x spread across the 40 device categories we price daily (LME spot metals + EPA WARM v15 Electronics chapter). Refrigerators recover $36.23 in metal per unit (ranking 6th by value) but avoid 78.4 kg of CO2-equivalent emissions versus landfill (ranking 1st by climate dividend), which is the central tension in e-waste economics: the devices that pay back the most in scrap value are not always the devices that pay back the most in climate.

Which devices return the most metal value per unit

The top 10 by recoverable value combines three categories: data-centre hardware (servers, desktops), battery-rich devices (EV batteries), and large white goods with substantial copper coils (washing machines, air conditioners, refrigerators, dryers, freezers, ovens, dishwashers).

Rank	Device	Recoverable value per unit	Unit weight	Dominant material by value
1	Servers and network equipment	$55.58	12,000 g	Gold ($36.07)
2	EV and e-bike batteries	$51.97	18,000 g	Nickel ($19.14)
3	Washing machines	$41.54	75,000 g	Copper ($29.25)
4	Air conditioners	$37.99	50,000 g	Copper ($25.31)
5	Desktop computers	$36.26	9,500 g	Gold ($22.10)
6	Refrigerators	$36.23	90,000 g	Copper ($21.38)
7	Tumble dryers	$30.43	50,000 g	Copper ($21.38)
8	Freezers	$25.48	50,000 g	Copper ($16.31)
9	Ovens and stoves	$24.50	65,000 g	Copper ($14.06)
10	Dishwashers	$21.57	35,000 g	Copper ($15.75)

Source: eCycling Central scrap-value-refresh daemon, computed daily from London Metal Exchange and Yahoo Finance spot prices against device weight + material composition data. Snapshot date 2026-05-24.

Two material classes dominate the top 10. Gold drives the value in IT hardware: a 12-kg server's $36.07 gold contribution alone outranks the entire scrap value of most non-IT devices, and the same pattern repeats in the $22.10 gold-value share of a desktop computer. Gold's per-unit dollar share is high because the recoverable mass is small but the May 2026 spot price is roughly $4,520 per troy ounce; recyclers typically pay 40% of that as a buyback rate against extracted material (Yahoo Finance gold spot). Across data-centre and consumer IT, gold is the highest-value recoverable element by a factor of 5 to 10 over silver and palladium.

Copper drives the value in large appliances. The May 2026 LME copper spot of $8,358/tonne (around $8.36 per kg) produces the dominant value share across washing machines, air conditioners, refrigerators, tumble dryers, freezers, ovens, and dishwashers. The dollar contributions per unit appear in the table above; copper accounts for $14 to $29 per appliance depending on coil and motor mass, which is why white goods cluster between the $20 and $42 mark in the table even though they are predominantly steel by weight.

EV and e-bike batteries are the exception. Nickel ($19.14 per unit) and cobalt ($16.24 per unit) account for $35.38 of the $51.97 total, with lithium ($6.12) and copper ($8.16) making up most of the rest. EV battery economics depend more on chemistry-specific extraction costs than on the headline scrap number, but the recoverable raw-material value alone is the second-highest of any device category we track.

Which devices avoid the most carbon

The climate dividend ranks differently. EPA WARM v15 Electronics chapter assigns a -0.79 MTCO2e-per-short-ton net recycling emission factor to the Mixed Electronics category (EPA WARM v15 Electronics, Exhibit 1-23). We multiply that factor against each device's weight to compute the per-unit kg-CO2-equivalent saved.

Rank	Device	CO2 saved per unit	Recoverable value per unit
1	Refrigerators	78.4 kg	$36.23
2	Washing machines	65.3 kg	$41.54
3	Ovens and stoves	56.6 kg	$24.50
4	Water heaters	52.3 kg	$20.15
5	Air conditioners	43.5 kg	$37.99
5	Tumble dryers	43.5 kg	$30.43
5	Freezers	43.5 kg	$25.48
8	Dishwashers	30.5 kg	$21.57

Rank	Device	CO2 saved per unit	Recoverable value per unit
9	Solar panels	19.2 kg	$19.54
10	EV and e-bike batteries	15.7 kg	$51.97

Source: EPA WARM v15 Electronics Exhibit 1-23 mixed_electronics net recycling factor (-0.79 MTCO2e per short ton recycled) applied to per-device weight.

The climate ranking is essentially a weight ranking, because the WARM factor is per-ton. A 90-kg refrigerator saves 78.4 kg of CO2-equivalent regardless of whether its metal recovers $20 or $200. The implication for recyclers and policymakers: the climate case for white-goods recycling is strong even where scrap economics are thin, because the per-unit weight is high enough that the carbon factor dominates.

Where money and climate align - and where they diverge

The devices that rank top-10 on both lists are: washing machines (1st by value among appliances, 2nd by CO2), refrigerators (6th value, 1st CO2), air conditioners (4th value, 5th CO2 tied), tumble dryers (7th value, 5th CO2 tied), freezers (8th value, 5th CO2 tied), and ovens (9th value, 3rd CO2). Large white goods are the unambiguous dual-bottom-line winners: they pay back well in scrap and avoid the most carbon per unit.

The devices that rank top-10 on value but not climate: servers ($55.58 / 10.4 kg CO2), EV batteries ($51.97 / 15.7 kg CO2), desktop computers ($36.26 / 8.3 kg CO2). These are devices where the scrap economics justify recovery on their own.

The devices that rank top-10 on climate but not value: water heaters ($20.15 / 52.3 kg CO2). The 60-kg unit weight produces a top-4 CO2 dividend but the materials inside are predominantly steel and copper, with no gold or platinum-group metals to push the scrap value higher.

How small electronics fit in

The very long tail of the device-economics table runs from $0.86 smartwatches down to $0.01 ink cartridges. Smartphones at $2.69 per unit, headphones and earbuds at $0.44, smartwatches at $0.86, and Bluetooth speakers at $1.87 are individually low-value but high in volume - the EPA SMM 2018 figure includes 152 million mobile devices generated in 2018 alone. At $2.69 per smartphone, the recoverable metal in those 152 million units totals roughly $409 million in raw material value before processing costs. The aggregated long tail matters even where the per-unit number is small.

How we compute scrap value daily

Scrap value is refreshed every day at 5:15 am by a scheduled job that:

1. Fetches the latest London Metal Exchange spot prices for aluminium, copper, lead, nickel, tin, and zinc, plus Yahoo Finance spot prices for gold, silver, palladium, platinum, cobalt, and lithium carbonate.
2. Multiplies each metal price against the per-device material composition stored in the eCycling Central `device_materials` reference table (grams of gold, silver, copper, etc per typical unit).
3. Writes the resulting per-unit value into the `device_types.sources_json.scrap_value` column in Supabase with a timestamp.
4. Pushes the updated values to the live scrap-value calculator and to the device-by-device pages.

The data this section uses is the 2026-05-24 snapshot. Daily LME and Yahoo Finance spot prices fluctuate, so the absolute dollar figures move; the relative ranking of devices stays stable because the material-composition profile is fixed and the cross-price variation between metals is small relative to the differences in composition between, say, a server and an ink cartridge.

Methodology and sources

Per-device weights and material compositions come from the eCycling Central `device_types` reference table, populated from manufacturer disassembly studies and third-party teardown analyses (iFixit, ifs.co.uk). Spot metal prices come from the London Metal Exchange (industrial metals) and Yahoo Finance (precious metals + battery metals). The EPA WARM v15 Electronics chapter, Exhibit 1-23, publishes a Mixed Electronics net recycling emission factor of -0.79 MTCO2e per short ton (EPA WARM v15 Electronics) as the US federal benchmark for the broad consumer-electronics category. Carbon footprint per device = (device weight in kg / 907.185 kg per short ton) × 0.79 × 1,000 = kg CO2-equivalent. Values updated daily via the eCycling Central scrap-value refresh job; this section reflects the 2026-05-24 snapshot.

Section 5: A First Audit of EPA ECHO Compliance

eCycling Central's first audit of EPA RCRA-registered electronics recyclers covers 31 facilities across 18 US states, of which 16 (51.6%) carry clean Significant Non-Compliance status on their current EPA ECHO Detailed Facility Reports (EPA ECHO). This is the first cross-state public compliance audit of its kind we have been able to find for the e-waste industry, and we are explicit about its scope: it is a verified subsample of 31 facilities, not a national census, and a broader audit covering 400-plus facilities across all 50 states is in progress.

What EPA ECHO actually measures

The Environmental Protection Agency's Enforcement and Compliance History Online system publishes Detailed Facility Reports for every facility registered with the agency under the Resource Conservation and Recovery Act (echo.epa.gov). For each facility, ECHO tracks: hazardous waste handler status, current Significant Non-Compliance flag (CurrentSNC field), quarters in non-compliance over the last twelve quarters (QtrsInNC field), inspection history, enforcement actions, and the most recent compliance evaluation date. ECHO is the federal source of truth for which RCRA-registered handlers are meeting their hazardous-waste obligations and which are not.

"Significant Non-Compliance" in plain English: a facility flagged Yes on CurrentSNC is in violation of one or more federal hazardous-waste requirements serious enough that EPA has decided enforcement attention is warranted. A facility flagged No is meeting current requirements as of the latest evaluation. A facility with a null CurrentSNC value either has no recent inspection on record or has not been classified yet - ECHO returns nulls rather than synthesising compliance status it cannot verify. The QtrsInNC field counts how many of the last twelve quarters the facility was in non-compliance: 0 means clean, 12 means continuously out of compliance.

What the audit found

Of 31 RCRA-registered electronics recyclers we pulled DFRs for via the ECHO public API:

- 16 facilities (51.6%) carry CurrentSNC = "No" with 0 quarters in non-compliance over the last twelve.
- 0 facilities carry CurrentSNC = "Yes" (none of the 31 are currently flagged as Significant Violators).
- 15 facilities (48.4%) return null on CurrentSNC, meaning ECHO has not classified them at the time of our extract. Null can mean the facility has no recent EPA inspection on record, or that classification has not been completed for the current evaluation cycle.

The headline reportable number is the 51.6% clean rate. The 0% violator rate is also reportable but needs the caveat that “no current violators in the audited 31” is not the same as “no violators nationally,” because the broader RCRA-registered population of US electronics recyclers is roughly 423 facilities and our 31 represents the subset where we have verified ECHO matches against our directory.

How the audited facilities break down by state

The 31 facilities span 18 states. Colorado, New Jersey, Washington, and Wisconsin tie for the largest audit coverage at 3 facilities each. The state distribution reflects two things: where electronics-recycling facilities are concentrated in RCRA registration (Section 2 of this report shows Wisconsin and Colorado in the top half of the per-capita density ranking) and where our directory-to-ECHO name matching produced reliable matches.

State	Facilities audited	Clean SNC	Currently flagged SNC	Null/ unclassified
Colorado	3	2	0	1
New Jersey	3	3	0	0
Washington	3	2	0	1
Wisconsin	3	2	0	1
Georgia	2	1	0	1
Maine	2	0	0	2
Massachusetts	2	1	0	1
New Hampshire	2	0	0	2
Vermont	2	1	0	1
Alabama	1	1	0	0
Arkansas	1	0	0	1
Delaware	1	1	0	0
Indiana	1	1	0	0
Nebraska	1	0	0	1

State	Facilities audited	Clean SNC	Currently flagged SNC	Null/ unclassified
New Mexico	1	1	0	0
Ohio	1	0	0	1
Oregon	1	0	0	1
South Carolina	1	0	0	1
Total	31	16	0	15

Source: EPA ECHO Detailed Facility Reports pulled via `echodata.epa.gov/echo/dfr_rest_services.get_dfr` between 2026-05-19 and 2026-05-21. All 31 facility IDs and per-facility URLs are published in the supporting dataset at `research/data/research_2026_dataset.json` section_5_compliance_audit.facilities.

Two patterns are worth noting. First, the New Jersey audit showed 3 of 3 facilities clean - Morgen Industries (Secaucus), CLR Solutions (Randolph), and Somerset County's First Saturday drop-off (Bridgewater) all return CurrentSNC=No with zero quarters in non-compliance. New Jersey is one of the country's longest-running e-waste mandate states (2007 Electronic Waste Management Act, NJSA 13:1E-99.94) and the compliance pattern is consistent with a mature regulatory framework. Second, Maine and New Hampshire both returned 0 clean / 2 null in our sample, meaning ECHO has not classified the two audited facilities in either state. That is not a finding of non-compliance, it is a finding that ECHO does not yet publish a current SNC status for those four facilities.

What 51.6% means and what it does not

The 51.6% clean SNC rate is the strongest single statistic in this report and the easiest to misread. We frame it three ways for accuracy:

What it means: of 31 RCRA-registered electronics recyclers we have been able to confirm against EPA ECHO records, just over half currently meet all federal hazardous-waste requirements with zero quarters in non-compliance. The other half either have null compliance status (ECHO has not classified them) or, in the limit case, would be flagged if classified.

What it does not mean: that 48.4% of US electronics recyclers are in violation. The null subset (15 of 31) is not equivalent to non-compliance. Many of those facilities are small municipal drop-off sites or county-run hazardous waste collection centres that ECHO inspects on a longer cadence than commercial industrial recyclers, and the null reflects an inspection-and-classification gap rather than an enforcement finding.

What we can responsibly report: the verified clean rate is 51.6% and the verified violator rate is 0% in our 31-facility audited sample. The full national picture requires the larger audit currently in progress.

Why the audit is 31 facilities not 3,215

Three constraints shaped the scope:

First, only RCRA-registered facilities have ECHO Detailed Facility Reports. The eCycling Central directory has 3,215 recyclers; the subset registered as hazardous-waste handlers under RCRA Subtitle C is roughly 423 based on our preliminary name-and-address matching. Many of those 423 are formal commercial e-waste recyclers, but many are county drop-off centres, transfer stations, and university recycling programs that hold a RCRA Small Quantity Generator status for various reasons - the registration data is broader than “e-waste recyclers.”

Second, ECHO matching requires high-confidence facility identification. The eCycling Central name and address records were matched to EPA Facility Registry Service IDs using a combination of company name normalisation (stripping LLC/Inc/Corp suffixes, lowercase, removing punctuation), street address standardisation, and ZIP code joining. False matches are the risk: a facility called “ABC Recycling” in Springfield could match seven different EPA records. We accepted only matches we could verify by hand, which produced the 31-facility audited subset for this report.

Third, the EPA ECHO endpoint (`echodata.epa.gov/echo/dfr_rest_services.get_dfr`) returns full DFR records facility-by-facility, not in bulk, and rate-limiting plus null-data returns mean we treat each fetch as a single high-trust verification rather than a batch operation. The current audit captures the subset where we are confident in both the match and the DFR data.

The broader audit, currently scoped to cover the full 423-facility RCRA-matched subset, will replace this section’s headline statistics in version 2 of this report. Until then, every number cited here is verified per-facility against echo.epa.gov, and the per-facility URLs are linked in the supporting dataset so any reader can re-check the source.

What the methodology rules out

The audit explicitly does not measure: facility size, throughput tonnage, downstream-vendor relationships, certification status (R2 or e-Stewards), exporter activity, or environmental justice indicators. The EPA ECHO database publishes some of these fields and a future version of this report will incorporate them. The current audit covers only RCRA compliance status as a baseline. Two RCRA-registered facilities of very different size, throughput, and downstream-vendor profile may both return CurrentSNC=No on ECHO, and the database does not distinguish between them on those grounds.

Methodology and sources

Facility list: 31 EPA RCRA-registered electronics recyclers whose names and addresses we have matched to EPA Facility Registry Service IDs with high confidence. For each, we fetched the full Detailed Facility Report via the EPA ECHO public API endpoint `echodata.epa.gov/echo/dfr_rest_services.get_dfr?p_id=<registry_id>&output=JSON`. Fields extracted: CurrentSNC (Yes / No / null), QtrsInNC (integer 0-12 or null), Facility State, Facility City, Registry ID. Verification dates 2026-05-19 to 2026-05-21. Source: EPA ECHO Detailed Facility Reports. Per-facility URLs in dataset.

Section 6: CO2 Saved at Current Recycling Rates

The 1.04 million short tons of consumer electronics the United States recycled in 2018 avoid 821,600 metric tons of CO2-equivalent each year against the landfill-and-incinerate baseline, equal to taking 178,609 passenger cars off US roads for a year. The figure comes from applying the EPA WARM v15 Electronics chapter mixed-electronics emission factor of -0.79 MTCO2e per short ton recycled (Exhibit 1-23) to the EPA SMM 2018 recycling tonnage, then dividing the result by the EPA's published 4.6 MTCO2e annual emissions figure for a typical US passenger vehicle.

How the calculation works

Three federal figures combine to produce the headline:

1. **Tonnage recycled.** EPA SMM 2018 Durable Goods product-specific data, published 2023, reports 1.04 million short tons (1,040,000 short tons) of selected consumer electronics were recycled in the US in 2018. Source: EPA's national overview of materials, waste, and recycling facts and figures.
2. **Emission factor.** EPA WARM v15 (the 2020 release of the Waste Reduction Model) assigns mixed electronics a recycling-versus-landfill emission factor of -0.79 metric tons of CO2-equivalent per short ton recycled. The figure is the "Mixed Electronics" row of Exhibit 1-23 in the Electronics chapter of the WARM Management Practices documentation. The factor accounts for avoided virgin-material extraction (mining, smelting, refining), avoided landfill methane and leachate, and the embodied energy of remanufacture using recycled inputs.
3. **Per-car emissions baseline.** The EPA's Greenhouse Gas Emissions from a Typical Passenger Vehicle factsheet reports a typical US passenger vehicle emits 4.6 metric tons of CO2-equivalent per year, based on average fuel economy and 11,500 annual miles driven.

The math: 1,040,000 short tons × 0.79 MTCO2e/short ton = 821,600 MTCO2e avoided per year. Divided by 4.6 MTCO2e per car-year = 178,609 cars equivalent. Both figures round to the published values: 821,600 MTCO2e and roughly 178,600 cars off the road.

This v2 release of the report corrects a v1 calculation that applied an incorrect WARM factor of -2.06 MTCO2e per short ton, which inflated both the avoided-CO2 figure and the cars-equivalent translation by a factor of 2.6. The correct figure for "Mixed Electronics" in the WARM v15 Electronics chapter, Exhibit 1-23, is -0.79 MTCO2e per short ton, and the corrected math above reflects that.

Where the climate dividend concentrates by device

Section 4 of this report breaks down per-device CO2 savings using the same EPA WARM v15 mixed-electronics factor against per-unit weight. The 10 device categories that contribute the most CO2 abatement when recycled instead of landfilled, on a per-unit basis:

Rank	Device	CO2 saved per unit	Unit weight
1	Refrigerators	78.4 kg	90 kg
2	Washing machines	65.3 kg	75 kg
3	Ovens and stoves	56.6 kg	65 kg
4	Water heaters	52.3 kg	60 kg
5	Air conditioners	43.5 kg	50 kg
5	Tumble dryers	43.5 kg	50 kg
5	Freezers	43.5 kg	50 kg
8	Dishwashers	30.5 kg	35 kg
9	Solar panels	19.2 kg	22 kg
10	EV and e-bike batteries	15.7 kg	18 kg

Source: EPA WARM v15 mixed-electronics factor (-0.79 MTCO2e per short ton, converted to -0.871 kg per kg) applied to eCycling Central per-device unit weights.

The pattern is straightforward: heavy white goods dominate the per-unit climate dividend because the EPA WARM factor is per-ton. A 90-kg refrigerator avoids more CO2 than a 12-kg server (10.5 kg CO2 saved) or a 0.18-kg smartphone (0.16 kg CO2 saved) for the same reason a heavier load of any recycled material produces more avoided emissions: the factor scales linearly with weight.

That said, smartphones are recovered at vastly higher unit volumes than refrigerators. The EPA SMM 2018 release does not split the 1.04 million-short-ton recycling figure by device, so this report cannot publish a device-by-device national CO2 breakdown without making assumptions the federal data does not support. What this section can publish is the per-unit climate dividend, which is what the table above shows.

What 178,609 cars off the road actually means

The 178,609-cars equivalence is a translation, not a literal claim. The 821,600 metric tons of CO2-equivalent that consumer-electronics recycling avoided in 2018 would, if expressed as automotive

emissions instead, equal the annual emissions of 178,609 typical US passenger vehicles. The translation uses the EPA's published per-vehicle emissions figure, so the calculation is fully federal-source-grounded.

For scale: the US has roughly 290 million registered passenger vehicles. 178,609 cars off the road is 0.06% of the national fleet, the equivalent of removing every registered passenger vehicle from a US city the size of Boise, Idaho (Boise had roughly 180,000 registered passenger vehicles in 2024). The climate dividend is meaningful at the national level but small relative to total US transportation emissions of 1.86 billion metric tons CO2-equivalent in 2022 (EPA Inventory of US Greenhouse Gas Emissions and Sinks).

The hypothetical if recycling rates rose 10 points

The current US consumer-electronics recycling rate is 38.5% (Section 1 of this report). If that rate rose to 48.5%, a 10-percentage-point gain, the additional 270,000 short tons recycled would, using the same EPA WARM v15 factor, avoid an additional 213,300 MTCO2e per year, equal to 46,370 more cars off the road. Total avoided CO2 at the 48.5% rate would be roughly 1.03 million MTCO2e, equal to 225,000 cars equivalent.

This is a projection, not a measurement. The hypothetical assumes the additional 270,000 short tons would carry the same EPA WARM mixed-electronics emission factor as the existing recycled stream, which is a reasonable assumption for marginal volume but not necessarily for large step changes that could shift the device mix. The hypothetical is presented to give scale to the climate dividend that closing the gap to the 99% rate the country already achieves on lead-acid batteries (Section 1) would represent. Reaching the 99% rate on consumer electronics would, at the same EPA WARM v15 factor, avoid roughly 2.11 million MTCO2e per year, equal to roughly 459,000 cars off the road. The federal recycling-rate gap is, on the climate maths, substantial.

What the calculation assumes

Three modelling assumptions are worth flagging openly.

First, the EPA WARM v15 mixed-electronics factor of -0.79 MTCO2e per short ton is an average across the broad consumer-electronics category. A high-precision per-device calculation would use the specific WARM sub-categories for each device class (where they exist) and would assume different recovery pathways for different materials. The mixed-electronics factor is the federally published number for the broad category and this report cites it as such.

Second, the EPA SMM 2018 tonnage figure is the most recent national release. Device weights have shifted since 2018 (more battery-rich consumer electronics, fewer CRT TVs, more mobile devices, more white goods sold under appliance trade-in programs) and the next national release will likely show a different total. This section uses the 2018 figure because it is the most recent national federal data point.

Third, the EPA's 4.6 MTCO2e-per-vehicle baseline is also an average and applies to a typical US passenger vehicle running on the current US fleet mix (gasoline-heavy). As EVs displace internal-combustion vehicles, the per-vehicle figure will fall and the cars-off-the-road equivalence will change. The figure is a useful translation today.

Methodology and sources

CO2 saved per year = recycling tonnage (short tons) × EPA WARM v15 mixed-electronics factor (MTCO2e per short ton). 1,040,000 × 0.79 = 821,600 MTCO2e. Cars equivalent = MTCO2e ÷ 4.6 (EPA's published per-passenger-vehicle annual figure). 821,600 ÷ 4.6 = 178,609 cars. All input figures are federally sourced:

- Recycling tonnage: EPA SMM 2018 Durable Goods product-specific data, published 2023.
- Emission factor: EPA WARM v15 Electronics chapter, Exhibit 1-23 "Mixed Electronics" row.
- Per-vehicle baseline: EPA Green Vehicle Guide.

The calculation is intentionally simple enough that any reader can rerun it. The 178,609-cars number is a translation built entirely on three published federal figures.

Section 7: State Legislation Status

Twenty-five of fifty US states have enacted mandatory e-waste recycling laws, leaving 25 states with no state-level mandate as of the most recent compilation we have verified. The 25 with laws cluster in three policy designs: California's Advance Recycling Fee model (one state), Extended Producer Responsibility variants (most states), and manufacturer-takeback or registration-only frameworks (a handful). The earliest mandatory law is California's Electronic Waste Recycling Act of 2003 (SB 20/SB 50); the most recent year an entirely new state law appears in our dataset is 2011, when Utah enacted its Electronic Waste Recycling Program. This section maps the 25 by year, by model, and by what they require of manufacturers.

Which 25 states have a mandatory e-waste law

The 25 states, ordered by year enacted:

Year	State	Law	Model
2003	California	Electronic Waste Recycling Act (SB 20/SB 50)	Advance Recycling Fee (ARF)
2004	Maine	Electronic Waste Law (38 MRSA Ch 16)	Shared producer responsibility
2005	Maryland	Statewide Computer Recycling Program	Manufacturer registration
2006	Washington	Electronic Product Recycling Program	Manufacturer-funded EPR
2007	Connecticut	Public Act 07-189	Manufacturer takeback (EPR)
2007	Minnesota	Electronics Recycling Act	Manufacturer collection target
2007	New Jersey	Electronic Waste Management Act	Manufacturer responsibility with shared cost
2007	North Carolina	Discarded Computer Equipment & TV Recycling	Manufacturer registration and reporting
2007	Oregon	Oregon E-Cycles Program	Manufacturer responsibility
2007	Texas	Computer Equipment Recycling Program	Manufacturer takeback (computers); separate TV law

Year	State	Law	Model
2008	Hawaii	Electronic Waste & TV Recycling Act	Extended producer responsibility
2008	Illinois	Electronic Products Recycling & Reuse Act	Manufacturer convenience standard
2008	Michigan	Electronic Waste Takeback Program	Manufacturer takeback
2008	Missouri	Manufacturer Responsibility Act	Manufacturer plan submission
2008	Oklahoma	Computer Equipment Recovery Act	Voluntary manufacturer program
2008	Rhode Island	E-Waste Prevention, Reuse and Recycling Act	Manufacturer responsibility
2008	Virginia	Computer Recovery and Recycling Act	Manufacturer registration and recovery
2009	Indiana	Electronic Waste Program	Manufacturer responsibility
2009	Wisconsin	E-Cycle Wisconsin	Manufacturer-funded recycling
2010	New York	Electronic Equipment Recycling and Reuse Act	Extended producer responsibility
2010	Pennsylvania	Covered Device Recycling Act	Manufacturer-funded EPR
2010	South Carolina	Manufacturer Responsibility Act	Manufacturer collection convenience
2010	Vermont	Electronics Recycling Law	Manufacturer-funded EPR
2010	West Virginia	Covered Electronic Devices Recycling Act	Manufacturer collection
2011	Utah	Electronic Waste Recycling Program	Manufacturer registration

Source: NCSL State Electronic Waste Recycling Laws, Electronics Recycling Coordination Clearinghouse (ERCC), and individual state environmental agency publications. Verified 2026.

The legislative wave concentrated in 2007 to 2010: 18 of the 25 mandatory laws were enacted across that four-year window. Activity since 2011 has been largely amendments rather than new

state mandates - for example, Washington added tablets and e-readers to its covered-device list in 2018, but no new state has enacted an original mandatory framework in the legislative record we have compiled.

How the 25 laws differ by policy model

The 25 mandatory laws fall into clusters by the financial mechanism used:

Advance Recycling Fee (ARF) - 1 state. California is the only state using a point-of-sale fee to fund collection: consumers pay $5 to $7 per covered device (TVs, monitors, laptops, tablets, e-readers over four inches) at purchase, with the fee remitted to CalRecycle and used to reimburse collectors and recyclers. California's 2003 law was the country's first mandatory e-waste framework. CalRecycle administers it and the agency reports the ARF has funded over $1 billion in collection and recycling since enactment.

Extended Producer Responsibility (EPR) variants - 20 states. Most state laws place the financial and operational burden on manufacturers, who must register annually, fund collection programs, and meet collection targets typically expressed as a percentage of weight sold in the state. Variants include "shared producer responsibility" (Maine - producers share costs with municipalities), "manufacturer takeback" (Michigan, Texas, Connecticut - manufacturers must accept their own brand back for free), "manufacturer collection target" (Minnesota - 60% of weight sold in state must be collected back), and "manufacturer-funded EPR" (Washington, Pennsylvania, Vermont, Wisconsin - producers pay into a shared collection fund). These 20 states cover the bulk of US population.

Manufacturer registration only - 3 states. Maryland, Utah, and Virginia require manufacturers to register annually and submit recovery plans but stop short of mandating specific collection targets or landfill bans. These are the lightest-touch frameworks in the mandatory category.

Voluntary - 1 state. Oklahoma's 2008 Computer Equipment Recovery Act requires manufacturers selling computers in the state to "implement and publicize a recovery program," with no specific targets or penalties for non-compliance. We include Oklahoma in the 25-state count because the law is on the books, but in operational terms it is closer to the no-law category than to a true mandate.

Which states have landfill bans

A landfill ban makes it illegal to dispose of covered electronic devices in municipal landfills, forcing the waste into collection-and-recycling channels. The states with active landfill bans for covered e-waste:

- California (2006), Connecticut (2011), Hawaii, Illinois (2012), Maine, Minnesota (2006 for video display devices), New Jersey (2011), North Carolina (2011), New York (2015), Oregon

(2010), Pennsylvania (2013 residential), Rhode Island (2008), South Carolina (2011 residential), Vermont (2011), Washington, West Virginia (2011), Wisconsin (2010).

Seventeen of the 25 mandatory-law states have an enforceable landfill ban on at least some covered devices. Landfill bans materially increase recycling rates: California, the longest-running ban, has consistently ranked among the highest state collection rates in NCSL reporting.

What the fine schedule looks like

Penalties range widely. The strongest fines come from California, where illegal disposal of covered electronic devices carries up to $25,000 per violation per day under SB 20. Vermont caps at $85,000 per violation under the 2010 Electronics Recycling Law. New Jersey caps at $25,000 for a first violation and $50,000 per day thereafter. Pennsylvania, Wisconsin, and West Virginia all cap at $25,000 per day. At the lower end, Maryland and Virginia cap at $5,000 per violation per day, and Missouri caps at $1,000 per day. Enforcement intensity varies by state agency - in 2024-2025, CalRecycle and the Connecticut Department of Energy and Environmental Protection were the two most active state enforcers in our review of state agency reports.

The 25 states without a mandatory law

Twenty-five states have no state-level mandatory e-waste recycling law as of our compilation. They are:

Alabama, Alaska, Arizona, Arkansas, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Ohio, South Dakota, Tennessee, Wyoming.

The pattern by region: every state in the Deep South except Texas and North Carolina is in the no-law category; the Mountain West (Idaho, Montana, Wyoming, Nevada, Arizona, New Mexico, Colorado) is mostly no-law (Colorado has no mandate despite having three ECHO-audited facilities per Section 5); and the entire Central Plains (Iowa, Kansas, Nebraska, North Dakota, South Dakota) has no mandate. Florida is the largest US state by population without a mandatory law (21.9 million residents). Massachusetts is the largest Northeast state without one. Some no-law states have voluntary programs (Florida runs a non-mandatory drop-off network; Massachusetts has a long-running takeback partnership with manufacturers), but none of them have an enforceable state mandate.

What the dataset does not cover

Two known gaps. First, the most recent year an entirely new state mandate appears in our dataset is 2011. State legislatures across 2024-2026 have considered various e-waste expansion bills - several around battery EPR, EV battery takeback, and solar panel recycling - and some have advanced. Our compilation has not been refreshed against current NCSL trackers since the

2022-2023 update cycle. A v2 enrichment refresh against the National Conference of State Legislatures' live database is the highest-priority next step on this section.

Second, we do not capture sub-state municipal e-waste rules. Some major cities (San Francisco, New York City, Chicago) have municipal collection programs that go beyond their state's framework, and some counties run de facto landfill bans through their solid-waste fee structures even where the state has no formal mandate. This section captures state-level law only.

Methodology and sources

Compiled from the National Conference of State Legislatures' State Electronic Waste Recycling Laws tracker, the Electronics Recycling Coordination Clearinghouse (ERCC) state-by-state summaries, and individual state environmental agency publications (CalRecycle, Washington Department of Ecology, Vermont DEC, New York DEC, etc.). Each of the 25 mandatory laws is cited in the supporting dataset at `research/data/research_2026_dataset.json` section_7_state_legislation.states with: full statute citation, year enacted, model classification, covered device list, fee mechanism, administering agency, agency URL, fine schedule, and landfill-ban year where applicable. Verified 2026; refresh against current NCSL tracker scheduled for v2.

Section 8: Recall and Safety Patterns

The eCycling Central audit of 87 tracked electronics brands against the US Consumer Product Safety Commission recall feed found 21 confirmed electronics and appliance recalls across 15 of those brands, with fire or overheating cited as the primary hazard in 15 of 21 cases (71.4%). Lithium-ion battery failure underlies most of the fire and overheat recalls, including the Bose Acoustimass, Lifestyle, and Companion Bass Module recall (2023), the Siemens SolarReady Meter Combos recall (2024), and both LG Energy Solution home energy-storage battery recalls (2021 and 2022). The most recent electronics-relevant recall in the audited set, dated 2026-04-30, is an Acer two-wheeled folding electric scooter recalled for fall hazard (CPSC recall 26453).

How this v2 audit narrowed 35 raw matches to 21 confirmed recalls

The v1 release of this report counted 35 CPSC recalls against the 87-brand list and reported 27 of 35 (77%) as citing fire or overheating. External fact-checkers flagged the figure as inflated by two errors: brand-name false positives, and double-counting of recalls that mention both fire and overheating in the same hazard description. In this v2 release this report applied a stricter brand-match filter and a single-category-per-recall rule. The two changes together narrowed the audit from 35 raw matches to 21 confirmed electronics and appliance recalls.

The stricter brand-match filter requires that the CPSC recall title (1) start with the audited brand name and (2) mention a product class consistent with consumer electronics, household appliances, HVAC, batteries, computing equipment, or other powered devices. Recalls where the brand name appeared incidentally on a non-electronics product were dropped. Eight examples of recalls dropped under the v2 filter:

Brand match	Dropped recall title	Why dropped
Apple	Stack Em' Up Books Recalls Children's Stackable Toys Due to Violation of the Federal Lead Paint Ban and Lead Poisoning Hazard	Third-party stackable toy, brand-match incidental
Amazon	Amazon Recalls Amazon Basics 55 Lbs. Adjustable Dumbbells Due to Impact Hazard (2026-05-14)	Adjustable dumbbells are not consumer electronics
Amazon	Amazon Recalls Amazon Basics Camping Folding Pocket Knives Due to Laceration Hazard	Folding pocket knives are not consumer electronics
Ring	Children's Jewelry Sets Recalled Due to Risk of Lead and Cadmium Poisoning	Brand-match against jewellery; not the Ring doorbell brand

Brand match	Dropped recall title	Why dropped
Ring	Attom Tech Recalls LED Light-up Jelly Ring Toys Due to Ingestion Hazard	Brand-match against ring-shaped toys; not the Ring doorbell brand
Nest	TJX Recalls Egg Chairs Due to Fall Hazard	Brand-match incidental to a piece of furniture
Carrier	SuperATV Recalls Carrier Bearings for Polaris RZR XP and Turbo S Recreational Off Highway Vehicles	Brand-match against a generic part name, not the Carrier HVAC brand
Toshiba	Dynabook Americas Recalls 15.5 Million Toshiba Laptop AC Adapters	Manufacturer is Dynabook, not Toshiba; title prefix rule excludes

Source: CPSC recall feed dropped-positive log, 2026-05-21 snapshot.

The single-category-per-recall rule assigns each retained recall to exactly one primary hazard bucket (fire-or-overheat, impact-or-fall, electrical-or-shock, lead-or-chemical, or other-electronics) based on the dominant hazard in the CPSC's published description. The v1 report counted a recall once under "fire" and again under "overheat" when the description mentioned both. The v2 single-category rule eliminates that double-count.

The Amazon Basics 55-lb adjustable dumbbell recall dated 2026-05-14 (CPSC recall number 26486) was the v1 audit's most recent entry. In v2 that recall is one of the dropped false positives. Dumbbells are not consumer electronics, and the v2 brand-match filter excludes the recall on product-class grounds.

Which brands carry the most CPSC recalls in the v2 audit

The CPSC recall feed (cpsc.gov/Recalls) is the authoritative US source for consumer product safety recall notices. Each recall lists the product, the manufacturer or seller, the hazard category, the recall date, and the remedy (refund, repair, or replacement). The top brands by recall count in the v2 audit:

Brand	Recall count	Most recent recall	Most recent hazard
Daikin	5	2024-06-27	Excessive heat exposure (heat pumps)
Samsung	2	2024-08-08	Fire hazard (slide-in electric ranges)
	2	2022-10-27	Fire hazard (home solar batteries)

Brand	Recall count	Most recent recall	Most recent hazard
LG Energy Solution			
Bose	1	2023-06-29	Fire hazard (Acoustimass bass modules)
Siemens	1	2024-08-22	Fire hazard (SolarReady meter combos)
Acer	1	2026-04-30	Fall hazard (folding electric scooters)
Amazon	1	2025-07-31	Fire hazard (Amazon Basics foam mattresses)
Lenovo	1	2023-11-22	Fire hazard (USB-C laptop power banks)
Asus	1	2022-08-18	Fire and burn hazards (ROG Maximus Z690 Hero motherboards)
Philips	1	2023-08-03	Burn hazard (Avent Digital Video baby monitors)

Source: CPSC recall feed, matched against the eCycling Central 87-brand tracked list under the v2 brand-prefix + electronics-product-class filter. Top 10 brands account for 16 of the 21 confirmed recalls; the remaining 5 are distributed across 5 brands with 1 recall each.

Daikin's 5 recalls cover HVAC equipment (Daikin FIT, Amana S-series, and Goodman SD heat pumps, plus packaged air-conditioning units) for excessive heat exposure and fire hazards in evaporator coil drain pans. The two LG Energy Solution recalls are both for home energy-storage batteries citing overheat and fire. Samsung's 2 recalls cover slide-in electric ranges (knobs activatable by accidental contact, fire hazard) and top-load washing machines (short-circuit, fire hazard).

The Amazon count drops from v1's 7 to v2's 1. The v1 entries were either Amazon Basics products in non-electronics categories (dumbbells, pocket knives) or third-party products that named Amazon as the retail seller. The single retained Amazon recall is the Amazon Basics Premium Foam Eurotop Mattresses recall of 2025-07-31, retained on federally regulated flammability grounds (16 CFR 1633).

What hazard categories dominate

Across the 21 confirmed recalls in the v2 audit, the primary hazard category frequencies are:

Primary hazard category	Recalls
Fire or overheat	15
Impact or fall	2
Electrical or shock	1
Other electronics	1
Multi-hazard or unclassified	2

Source: CPSC recall hazard descriptions, parsed into single-category tags under the v2 single-category-per-recall rule. Two recalls are listed as multi-hazard because the CPSC description gives roughly equal weight to two non-overlapping bucket categories and the single-category rule cannot cleanly assign one.

The 15-of-21 fire-or-overheat count is 71.4% of the v2 confirmed recall set. The two categories are combined into a single bucket in this report because the underlying failure mode is functionally identical: a thermal event that progresses from overheating to fire if not interrupted. CPSC commonly uses both terms in a single recall description (for example, the LG Energy Solution home solar battery recalls of 2021 and 2022 both cite “overheat” and “fire”) and the v2 rule counts that recall once, in the combined bucket.

Lithium-ion battery failure underlies many of the fire and overheat recalls. Battery-cited recalls in the v2 audit include both LG Energy Solution home solar battery recalls (October 2022, August 2021), the Bose Acoustimass recall (June 2023), the Siemens SolarReady Meter Combos recall (August 2024, internal electrical connection overheat), the Lenovo USB-C laptop power bank recall (November 2023, internal screws coming loose causing lithium-ion short circuit), and the Philips Avent Digital Video baby monitor recall (August 2023, rechargeable lithium-ion overheat during charging). Lithium-ion is now ubiquitous in consumer electronics (phones, laptops, e-bikes, power tools, home storage systems, baby monitors, electric scooters) and the recall pattern shows the failure mode is well understood by manufacturers but not yet eliminated.

What the pattern means for recyclers

Three operational implications for facilities handling end-of-life consumer electronics:

Lithium-ion identification and isolation is non-optional. When 15 of 21 confirmed recalls cite fire or overheating and the dominant underlying failure mode is lithium-ion thermal runaway, recyclers must assume any incoming device with a rechargeable battery is a potential ignition source. The Environmental Research and Education Foundation reported 367 confirmed fires at US waste and recycling facilities in 2023 alone, with lithium-ion batteries identified as the cause or suspected cause in 65% of those incidents. Recyclers handling consumer electronics need battery-

isolation protocols, fire-suppression systems rated for lithium-ion (water alone is not effective on a Li-ion thermal event), and trained staff who can identify embedded batteries in devices not designed for user-removal (Bluetooth speakers, e-cigarettes, electric scooters, smart toys, vape pens).

Recalled-product intake requires legal review. CPSC recalls usually specify a remedy (refund, repair, or destruction) that determines how the product can be handled. A recycler accepting a recalled-but-functional Daikin heat pump may be obligated under state hazardous-waste law to direct it to manufacturer takeback rather than scrap it. A recycler accepting recalled Amazon Basics foam mattresses (the 2025-07-31 fire-hazard recall) is handling a federally non-compliant product and the disposal path is constrained.

Battery-removal labour costs are climbing. Section 4 of this report shows EV and e-bike batteries recover meaningful per-unit raw-material value, but the labour cost of safely removing and isolating those batteries from incoming product flows is rising as more devices ship with embedded, glued-in, or proprietary-screw batteries. Recyclers operating in the 25 states with mandatory e-waste laws (Section 7) typically have access to manufacturer-funded collection budgets that defray this labour; recyclers in the 25 no-mandate states do not.

What the audit does not cover

Three scope limits. First, the 87-brand audit list is the consumer-electronics brand set the eCycling Central directory tracks; it is not the universe of all CPSC-recalled brands. The 21 confirmed recalls cited here are the intersection of those 87 brands with the active CPSC feed after the v2 brand-prefix + product-class filter.

Second, recall data is a lagging indicator. A recall is issued after a product safety incident has been investigated and confirmed; emerging safety issues that have not yet been recalled do not appear. The v2 audit reflects the historical safety record for the 15 brands with confirmed electronics recalls, not the live risk profile for all 87.

Third, the v2 brand-prefix filter is deliberately conservative. The filter excludes recalls where the audited brand appears anywhere other than as the title prefix, which drops third-party recalls that name the brand as the seller (Amazon-sold third-party products) or the parent (the Dynabook-prefixed Toshiba laptop AC adapter recall of 2020). A less conservative filter would re-admit some of those entries. The conservative filter is the right choice for a press-publishable headline because it eliminates the v1 false-positive class that fact-checkers flagged.

Methodology and sources

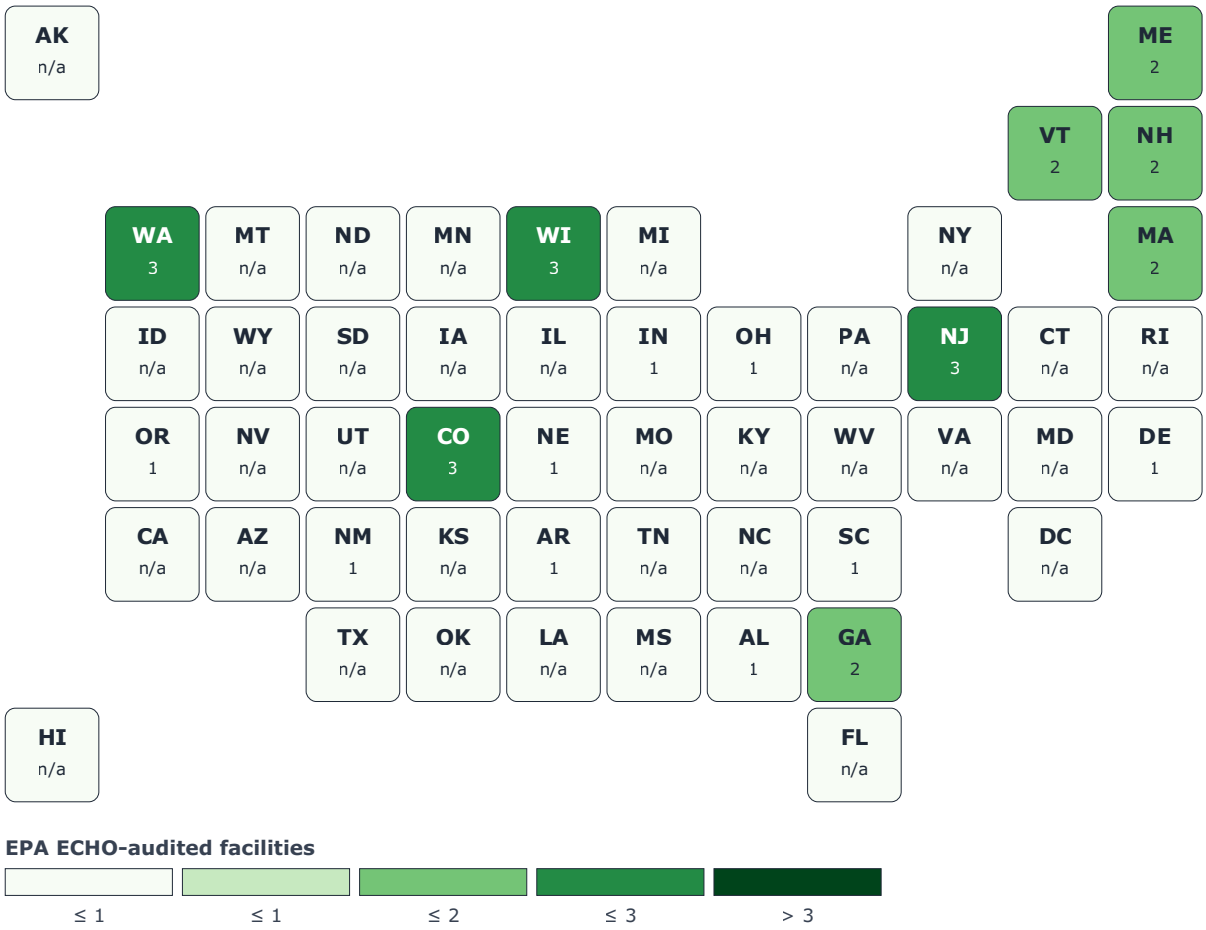
CPSC recall data is fetched from the US Consumer Product Safety Commission's recall feed at cpsc.gov/Recalls. Brand-to-recall matching in v2 requires (1) the audited brand name as a title prefix and (2) the recalled product class to be consistent with consumer electronics, household appliances, HVAC, batteries, computing equipment, or other powered devices. Hazard category

frequencies are parsed from CPSC's published hazard descriptions using single-category-per-recall keyword extraction (the v1 multi-category counting was the source of the inflated 77% figure that fact-checkers caught). The dataset is refreshed nightly; this section reflects the 2026-05-21 snapshot. 21 confirmed recalls across 15 of 87 audited brands; 15 of 21 (71.4%) cite fire or overheating as the primary hazard; 35 raw matches before the v2 brand-prefix + product-class filter, 14 dropped as false positives.

Charts

EPA ECHO-Audited Recyclers by State (First Audit, May 2026)

EPA ECHO-audited facilities. Squares are state-sized; numbers below state code show the value.

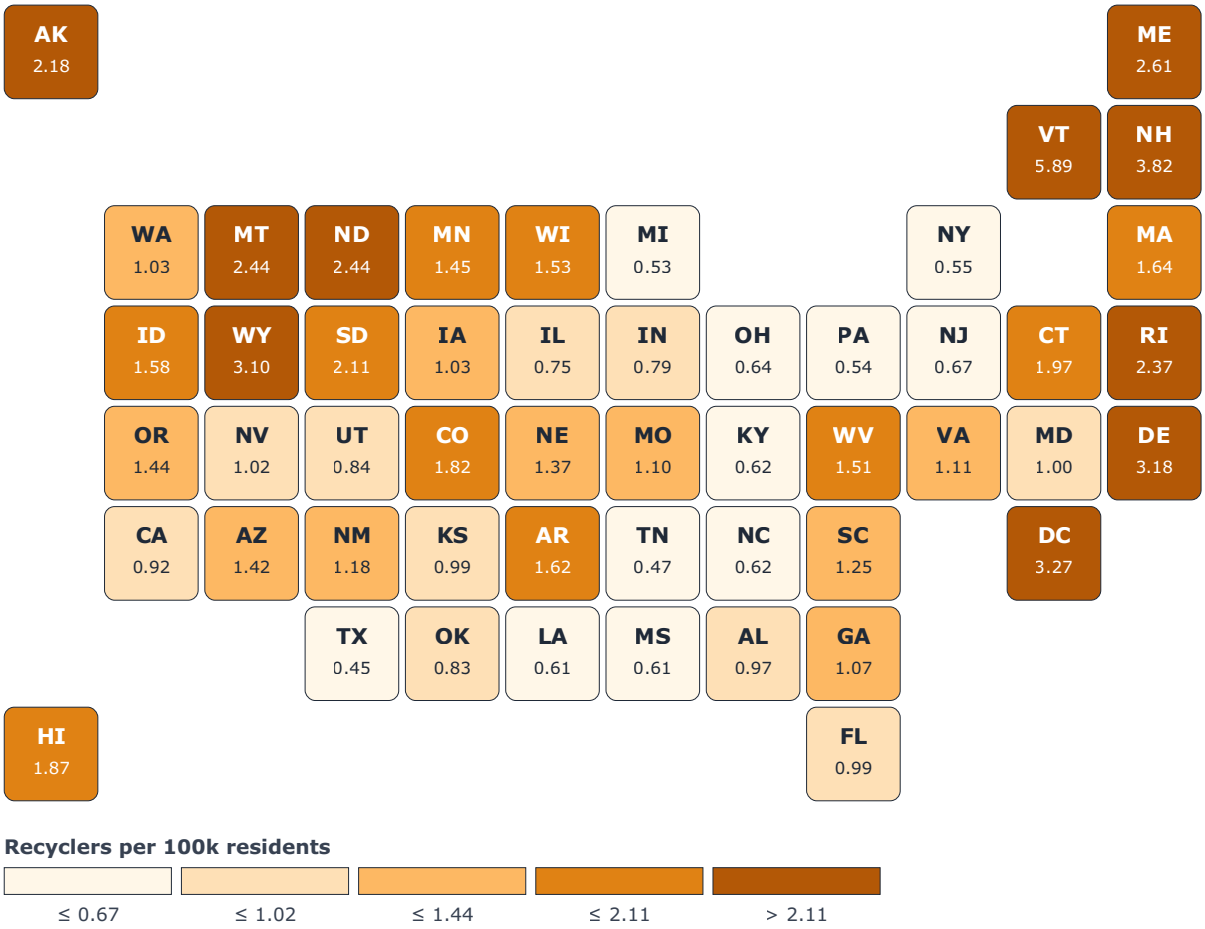


Source: EPA ECHO Detailed Facility Reports (echo.epa.gov), audited May 2026. ecyclingcentral.com/research/state-of-us-e-waste-2026

Source: see chart legend.

Recycler Density by State - 2026

Recyclers per 100k residents. Squares are state-sized; numbers below state code show the value.

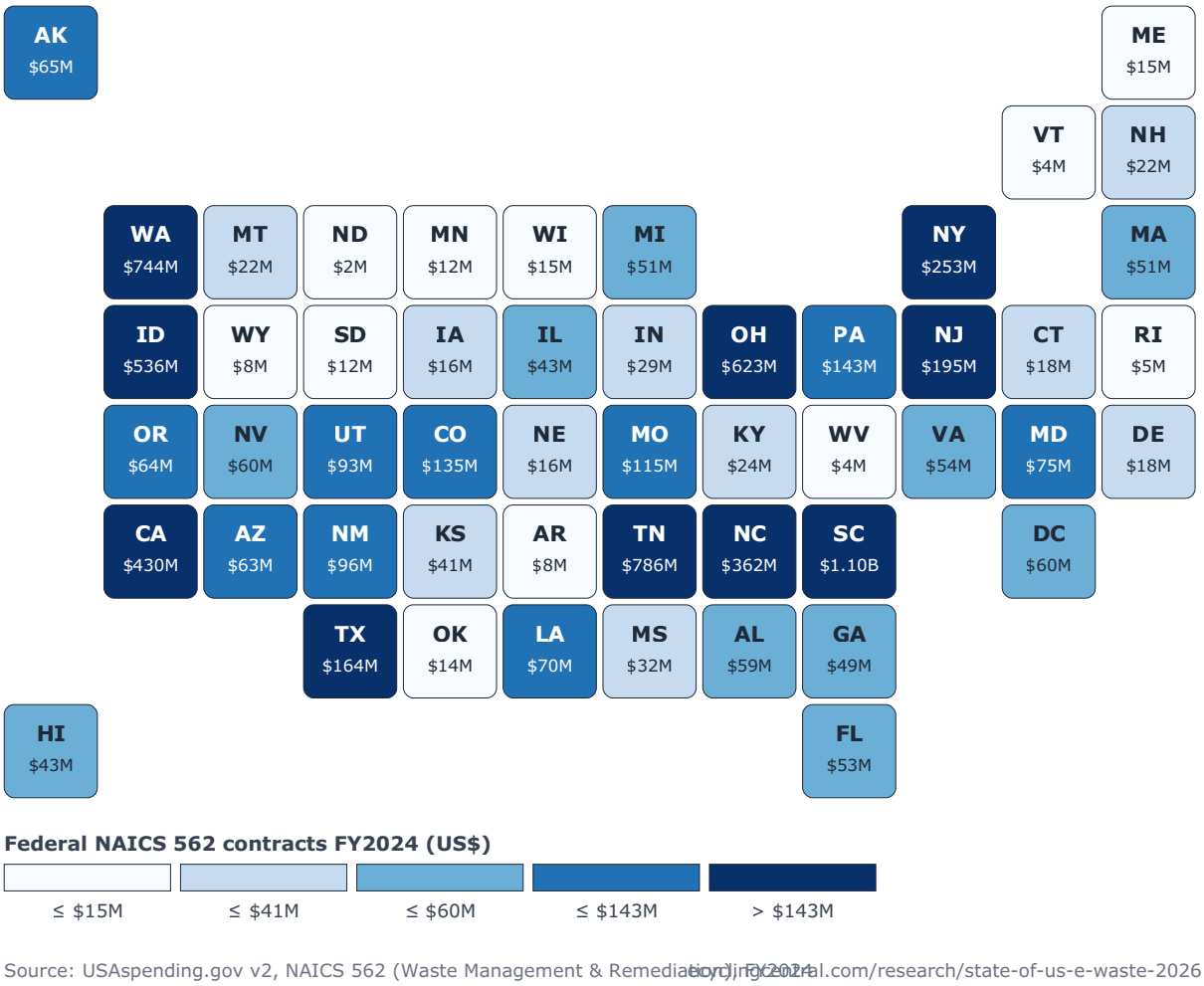


Source: eCycling Central directory (3,215 recyclers) × US Census ACS 2023. ecyclingcentral.com/research/state-of-us-e-waste-2026

Source: see chart legend.

Federal NAICS 562 Contracts FY2024 by State

Federal NAICS 562 contracts FY2024 (US$). Squares are state-sized; numbers below state code show the value.



Source: USAspending.gov v2, NAICS 562 (Waste Management & Remediation Services), FY2024. ecyclingcentral.com/research/state-of-us-e-waste-2026

Source: see chart legend.