



July 16, 2026

2025 Annual Report

Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes

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Executive Summary

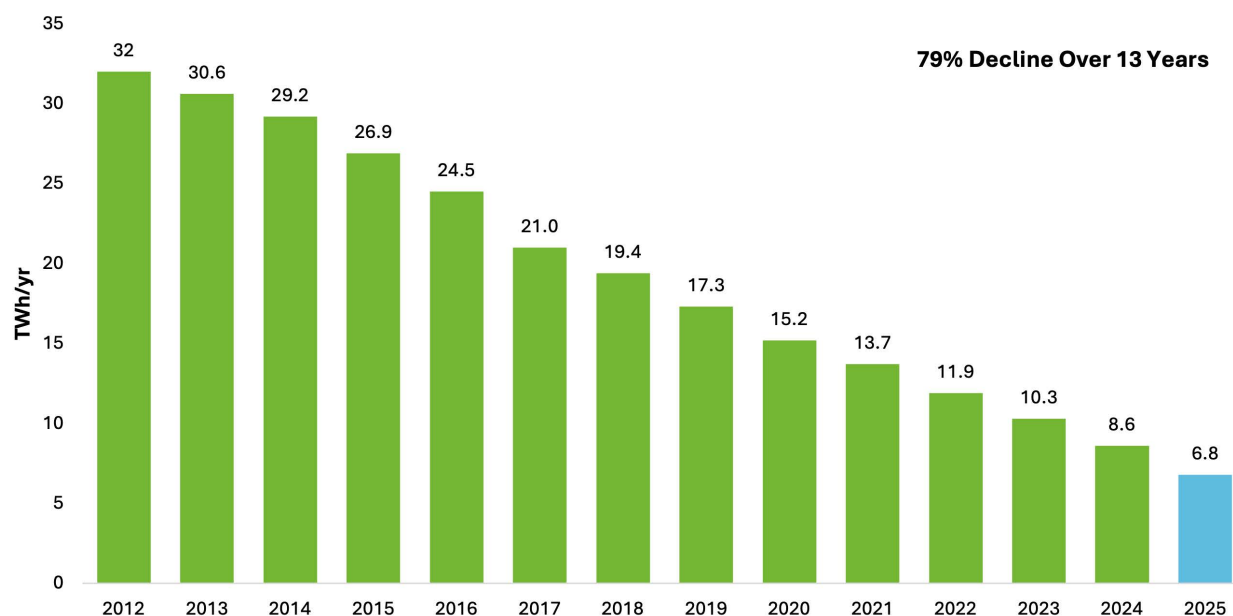
In 2012, the pay television industry, led by NCTA - The Internet & Television Association, the Consumer Technology Association, and CableLabs®, signed the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes with the goal of increasing the energy efficiency of set-top boxes while protecting rapid innovation and timely introduction of new features. The signatories of the Voluntary Agreement include all of the largest pay-TV service providers in the United States and the major set-top box manufacturers. The service provider signatories provided multichannel video services to approximately 41 million American households in 2025, accounting for more than 96% of the traditional live pay-TV market.

In 2013, leading energy efficiency organizations entered the agreement in the role of “Energy Advocates” that monitor and participate in all aspects of the program to assure its rigor, transparency, and accountability.

One of the requirements of the Voluntary Agreement is the publication of an annual report; Evergreen Economics was chosen to act as the Independent Administrator of the Agreement this year. This annual report provides a summary of developments for the previous calendar year, 2025. Annual reports for previous years and energy information for consumers and other stakeholders can be found at www.energy-efficiency.us.

The primary commitment of the Agreement is that in each calendar year 90% of each service provider’s new set-top box purchases meet prescribed energy efficiency levels. These levels have been revised three times to become more rigorous. As documented in this report, 100% of the service providers’ new set-top box purchases met the applicable energy efficiency levels of the Voluntary Agreement in 2025.

National set-top box annual energy consumption has declined by approximately 79% under the Voluntary Agreement, from 32 TWh in 2012 to 6.8 TWh in 2025 (as shown in Figure ES 1 below). While a significant portion of this decline is due to subscriber reductions, the new set-top boxes used by customers today are also much more efficient. The weighted average power usage of new devices decreased from 122 kWh/year in 2013 to 34 kWh/year in 2025, a decline of 72%, even though functionality and features have increased.

Figure ES 1: Nationwide Annual Energy Used by Set-Top Boxes

The 25.2 TWh reduction in annual national energy consumption by set-top boxes is equivalent to the power generated by eight typical 500-megawatt coal-fired power plants in a year.¹ In 2025, consumers spent \$4.36 billion² less on their utility bills and there were 16.9 million fewer metric tons of CO₂ emissions from power plants than would have occurred if the power levels and volume of set-top boxes had remained unchanged from 2012 when the Voluntary Agreement was adopted.³ The following Table ES 1 and Figure ES 2 present the cumulative effect of these year-over-year declines during the thirteen years of the Voluntary Agreement, during which energy consumption has been reduced by an estimated 180.6 TWh, which represents approximately \$26.5 billion in consumer electricity costs and avoidance of 126 million metric tons of CO₂ emissions. The cumulative consumer savings estimate accounts for changes in electricity prices over time, using the residential electricity prices that prevailed when the savings were realized.

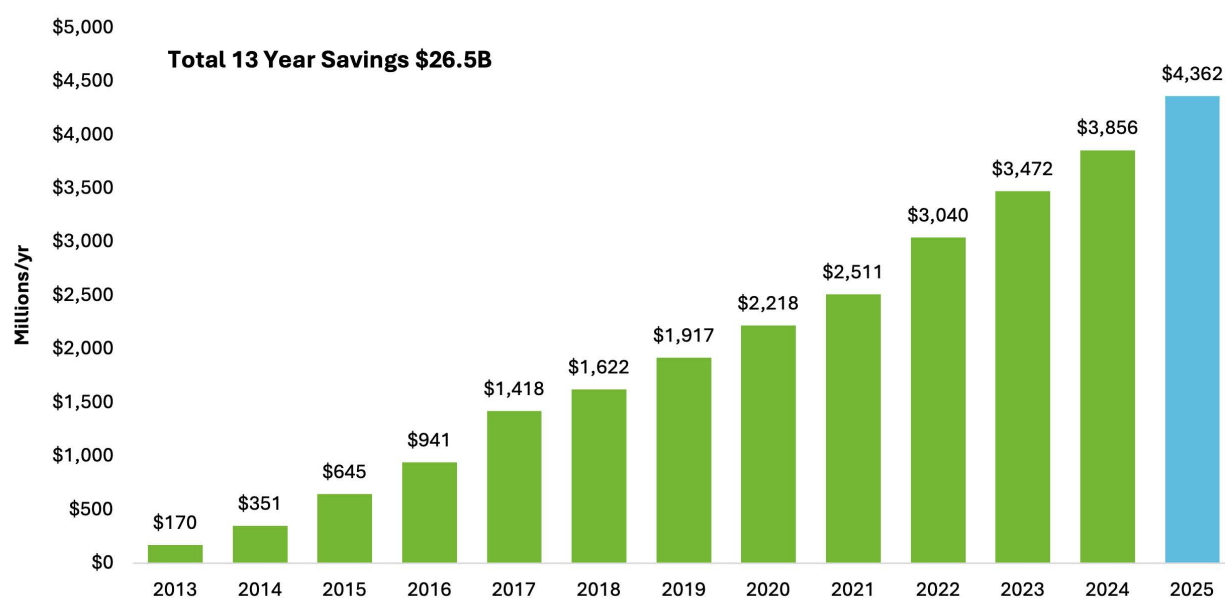
¹ A common unit in measuring energy efficiency savings is the “Rosenfeld” (3 terawatt hours per year), the same amount of electricity generated by a conventional 500-megawatt coal-fired power plant each year. See <https://www.scientificamerican.com/article/rosenfeld-energy-savings>.

² This calculation is based on the national average residential energy cost of 17.30 cents per kWh for 2025. See U.S. Energy Information Administration, Short-Term Energy Outlook Figure 29, U.S. Residential Electricity Price, https://www.eia.gov/outlooks/steo/report/elec_coal_renew.php. Aggregate savings calculations in this report are based upon the residential energy costs at the time of prior annual savings calculations.

³ Emission reduction estimates in this report are based on the U.S. Environmental Protection Agency’s Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

Table ES 1: Energy Reduction Equivalencies, 2013-2025⁴

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Lifetime of VA
Total National Energy Consumed (TWh/yr)	30.6	29.2	26.9	24.5	21.0	19.4	17.3	15.2	13.7	11.9	10.3	8.6	6.8	235.4
Total National Energy Reduction (TWh/yr)	1.4	2.8	5.1	7.5	11.0	12.6	14.7	16.8	18.3	20.1	21.7	23.4	25.2	180.6
500 MW Power Plant Equivalents Saved (Rosenfelds)	0.5	0.9	1.7	2.5	3.7	4.2	4.9	5.6	6.1	6.7	7.2	7.8	8.4	N/A
Electricity Costs Saved (Million\$/yr)	\$170	\$351	\$645	\$941	\$1,418	\$1,622	\$1,917	\$2,218	\$2,511	\$3,040	\$3,472	\$3,856	\$4,362	\$26,522
CO2 Avoided (MMT)	1.0	1.9	3.5	5.3	8.2	8.9	10.4	11.9	13.0	14.3	15.4	15.7	16.9	126.35

Figure ES 2: Value of Annual Electricity Consumption Reductions Under the Voluntary Agreement

The market for the purchase of new set-top boxes is fundamentally different than in 2012 when the Voluntary Agreement was adopted:

- Consumer broadband internet access services (nearly all of which are delivered by the service provider signatories) have enabled households that subscribed to pay-TV services to replace such services with third-party streaming services, thereby reducing the use of set-top boxes.

⁴ A few minor adjustments were made to the previous years' CO2 avoided conversions due to updates to the conversion factors used to ensure the most accurate conversion factors were used in each corresponding year as outlined in the EPA greenhouse gas equivalencies calculator revision history, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-revision-history>.

As a result, subscriptions to traditional pay-TV services have fallen from more than 100 million at the start of the Voluntary Agreement to less than 43 million at the end of 2025.

- In 2014, the signatories purchased more than 46 million set-top boxes, but in 2025, new purchases declined to only 3.9 million units.
- Approximately three-fourths of all purchases in 2025 were highly efficient IP Non-DVR set-top boxes, a category that was not defined when the Agreement began. The weighted average power usage of these new IP Non-DVR devices in 2025 was 20.5 kWh/year. By contrast, the primary concern of regulators and energy efficiency advocates that led to the establishment of the Agreement were DVRs that at that time used an estimated 267 kWh/year.
- Purchases of DVRs have decreased significantly from 12.7 million in 2014 (27% of all purchases) to fewer than 363,000 in 2025 (9% of purchases) as service providers have shifted from deploying a DVR for each television to whole-home DVR services that use one DVR per home or cloud DVR services that do not require the use of DVR set-top boxes at all.
- The number of set-top boxes has also declined because the service providers' subscribers are using service provider and third-party apps to watch their video content on millions of consumer-owned Internet-connected devices, such as smart TVs, smartphones, tablets, personal computers, and low-power streaming devices.⁵

Meanwhile, set-top boxes have not only become far fewer in number, but those that remain are much more energy efficient. The most significant improvement in 2025 occurred in the category which had the most purchases, Non-DVRs. Non-DVRs represented approximately three-fourths of all set-top boxes purchased in 2025, and all Non-DVR purchases in 2025 were IP Non-DVRs. Because IP devices tend to be lower powered than non-IP devices, the weighted average TEC for Non-DVRs decreased by 23% in 2025 from the prior year and now has fallen by 83% from 2012 to 2025. Energy usage of the other two major categories of new set-top boxes has also declined over this period, as shown in Table ES 2 below.

Table ES 2: Weighted Avg. Typical Energy Consumption (TEC) for Major Set-Top Box Categories

Category	Weighted Average TEC (kWh/yr)		Percent Change in Weighted Average, Pre-2013 to 2025
	Pre-2013 Stock	2025 Purchases	
DVR	267	117.6	-56%
Non-DVR	119	20.6	-83%
Thin Client	90	50.5	-44%

⁵ D+R International, 2024 Annual Report on the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes, p. 14-17, https://energy-efficiency.us/wp-content/uploads/2025/09/US-STB_2024-Report-1.pdf.

The combination of the significant decline in the number of deployed set-top boxes and the significant improvement in the energy efficiency of new devices is enabling the signatories to achieve the objectives of the Voluntary Agreement.

Overview of the Voluntary Agreement

Cable, satellite, and telco service providers offer pay television services to approximately 43 million U.S. households.⁶ These services rely upon the use of customer-premises equipment, often referred to as set-top boxes, to make the services accessible to consumers' televisions. Each set-top box contains hardware and software to receive content from service providers and process it for home networks, display devices, and recording devices. The underlying delivery network and the types of service provided vary widely among service providers. As a result, set-top boxes are highly specialized equipment, and the devices have changed as the service providers introduced new technologies and services.

As with all electronic devices, set-top boxes must utilize power to operate. In aggregate, set-top boxes in the United States consumed an estimated 32 TWh of electricity in 2012, constituting 18% of residential consumer electronics electricity consumption and 2.2% of all residential electricity consumption.⁷ To reduce the amount of energy consumed by set-top boxes while protecting rapid innovation and timely introduction of new features, the pay-TV industry crafted the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes. The Voluntary Agreement provides a framework for the pay-TV industry to deliver market-based energy efficiency gains that keep pace with technological innovation. In 2013, the American Council for an Energy-Efficient Economy (ACEEE) and the Natural Resources Defense Council (NRDC) joined the agreement as “Energy Advocates” that monitor and participate in all aspects of the program, and the agreement features numerous provisions to assure transparency and accountability.⁸

The signatories of the Voluntary Agreement represent all the major pay-TV service providers, equipment vendors, and related industry organizations in the United States. Combined, these companies reported providing multichannel video service to approximately 41 million American households in 2025, accounting for more than 96% of the traditional live pay-TV market. The parties have unanimously extended the Voluntary Agreement three times, with the latest amendment extending its commitments through 2028.

The primary commitment of the Agreement is that in each calendar year 90% of each service provider's new set-top box purchases meet prescribed energy efficiency levels. These levels have

⁶ This figure is based on data provided by NCTA and CTA and does not include customer counts for third-party streaming services.

⁷ Bryan Urban; Victoria Shmakova; Brian Lim; Kurt Roth, Energy Consumption of Consumer Electronics in U.S. Homes in 2013, Final Report to the Consumer Electronics Association (CEA®), Fraunhofer USA Center for Sustainable Energy Systems (2014). This report estimated 31 TWh of use in 2013, which is consistent with the annual report's estimate of ongoing declines under the Voluntary Agreement since set-top boxes used 32 TWh in 2012.

⁸ NRDC withdrew as a signatory in October 2025, informing the Steering Committee that it is “proud of the efficiency progress made through the voluntary agreement” but that it did not have sufficient staff resources to continue to participate.

been revised three times to become more rigorous. The current “Tier 4” levels, as listed in Table 11, are applicable to the parties’ commitments.

Voluntary Agreement Objectives

The primary objective of the Voluntary Agreement is to continue improvements in the energy efficiency of set-top boxes while preserving flexibility for innovation. As demonstrated below, the signatories are achieving these objectives. In 2025, set-top boxes nationwide consumed only one-fifth of the energy they consumed in 2012 when the Voluntary Agreement began (6.8 TWh down from 32 TWh), and the weighted energy consumption of the signatories’ new 2025 purchases was 72% lower than the typical models of that earlier era even as the functionality of set-top boxes increased.

Voluntary Agreement Signatories and Steering Committee

The current signatories and participants in the Voluntary Agreement are listed below. Each of these entities participates in the Steering Committee.

Energy Advocate

- American Council for an Energy-Efficient Economy (ACEEE)

Service Providers

- Charter Communications (“Spectrum”)
- Comcast
- Cox Communications
- DIRECTV⁹
- DISH Network
- Frontier¹⁰
- Optimum (formerly Altice USA)
- Verizon

Manufacturers

- Sagemcom
- Vantiva

⁹ AT&T was originally a separate signatory from DIRECTV, as AT&T provided AT&T U-verse video services prior to acquiring DIRECTV in 2015. After AT&T acquired DIRECTV both entities maintained separate signatory status but, as a result of a transaction completed in 2025, AT&T no longer has any ownership interest in DIRECTV and no longer offers any facilities-based traditional video services, including AT&T U-verse (now operated by DIRECTV). Accordingly, AT&T does not purchase set-top boxes and has withdrawn as a signatory of the Voluntary Agreement.

¹⁰ Frontier was acquired by Verizon in early 2026.

Other Organizations

- Cable Television Laboratories (CableLabs)
- Consumer Technology Association (CTA)
- NCTA – The Internet & Television Association

The Voluntary Agreement obligates the Steering Committee to designate an Independent Administrator and publish an annual report. The Steering Committee designated D+R International, Ltd. as the Independent Administrator in 2013, and designated Evergreen Economics, Inc., as Independent Administrator starting in 2026.

The Voluntary Agreement requires that the Steering Committee meet at least once annually. The Steering Committee convened on June 13 and July 25, 2025.

Representatives of the signatories have continued to offer updates to regulators and other stakeholders regarding the ongoing execution of the Voluntary Agreement.

CTA and NCTA are required to provide an annual report to the Independent Administrator with information that may be relevant to this report, including the estimated total number of U.S. residential multichannel video subscribers served by all service providers (including those outside of the Voluntary Agreement) during the Reporting Period.

Service Provider Commitments

The primary service provider commitment is that at least 90% of its set-top box purchases will meet specified energy efficiency levels. The original levels were replaced by Tier 2 levels in 2017, Tier 3 levels in 2020, and Tier 4 levels in 2023. Service providers also commit to public posting of energy efficiency information for consumers.

Independent Administrator Role

The Voluntary Agreement obligates the Steering Committee to designate an Independent Administrator. The Steering Committee designated Evergreen Economics as the Independent Administrator in 2026; D+R International served in this role in the past. Under the Voluntary Agreement, the Independent Administrator must aggregate and compile confidential procurement data submitted by service providers and assess whether the service provider commitments have been met. If the commitments are not met, the Independent Administrator initiates a remediation process following the procedures set out in the Voluntary Agreement.

The Independent Administrator is required to publish its findings in an annual report. The 2025 Annual Report is the thirteenth report published. Evergreen Economics also oversees third-party lab verification of the energy use of selected models reported by each signatory and is required to conduct a random audit of at least one service provider's procurement figures each year. The 2025 procurement audit report is presented in Appendix C.

New Feature Allowances

The Voluntary Agreement includes a process that enables new features to be deployed without advance notice or permission, so that companies can secure the competitive benefits of first-mover advantages and so that consumers are not delayed from accessing new features. At the same time, the process assures that such new features are promptly and transparently brought within the bounds of the Voluntary Agreement's commitments to energy efficiency.

If a service provider deploys a set-top box that includes a new feature with no allowance, and the presence of the feature causes the set-top box to exceed the Voluntary Agreement's applicable efficiency commitment levels, the new feature process permits the service provider to set and report an appropriate initial allowance based upon its best estimate of the amount of energy consumed by the new feature. No new feature allowances were submitted for the 2025 reporting period.

Increased Energy Efficiency of Set-Top Boxes

Table 1 demonstrates the continued progress made by the signatories in improving the energy efficiency of set-top boxes.

Non-DVRs is the category with both the most significant improvement in 2025 as well as the most purchases. Non-DVRs represent three-fourths of all set-top boxes purchased in 2025, and since 2024 100% of these new Non-DVRs have utilized efficient IP technology (compared to less than 90% in 2023). Because IP devices tend to use less power than non-IP devices, migration to IP devices has driven energy use down. The weighted average TEC for Non-DVRs decreased by 23% in 2025 from the prior year and overall has fallen by 83% from 2012 to 2025, as illustrated in Table 1 below.

Table 1: Weighted Average Typical Energy Consumption of New Purchases for Major Set-Top Box Categories (kWh/year)

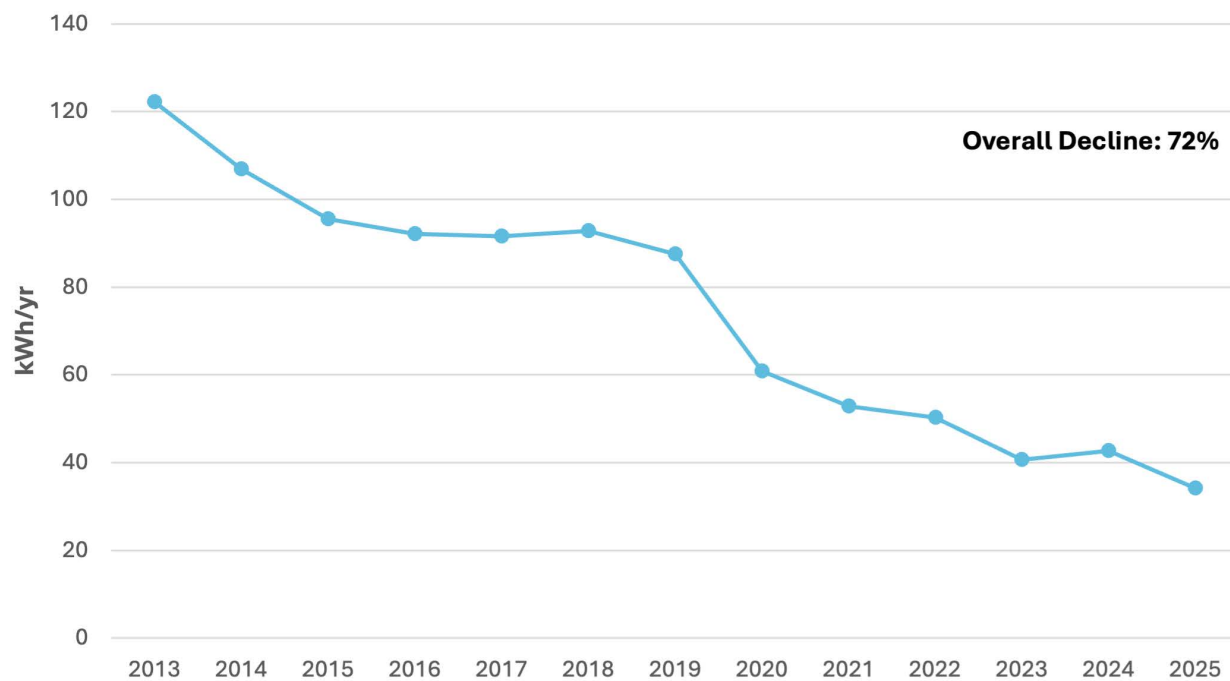
Category	Pre-VA	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	% Change 2012-2025
DVR	267	195.4	179.4	170.6	161.3	142.9	138.7	134.4	144.8	146.5	143.6	128.9	115.1	117.6	-56%
Non-DVR	119	108.6	103.3	92.6	85.6	90.8	91.8	74.1	49.0	42.5	44.0	31.5	26.6	20.6	-83%
Thin Client	90	51.4	50.0	49.1	46.9	44.3	45.4	45.4	48.0	47.6	49.1	55.8	47.1	50.5	-44%

DTAs were not purchased in 2025.

The weighted average TEC of new DVRs purchased in 2025 increased by 2% relative to 2024 purchases but still has fallen by more than half since the start of the Voluntary Agreement. All of the DVR models purchased in 2025 were also purchased in 2024, so the small increase reflects relative changes in the numbers purchased by each provider and not the release of a new higher-powered DVR. The increase is also mitigated by the fact that a very small number of DVRs were purchased in 2025.

The overall annual weighted average TEC of all set-top box purchases has declined by 72% since the start of the Voluntary Agreement, as shown in Figure 1 below. The decline from more than 122 kWh/year for the first reported purchases in 2013 to 34 kWh/year in 2025 corroborates the 79% reduction in national energy consumption over that same period as calculated below, since this metric is independent of stock estimates and subscriber count adjustments.

Figure 1: Weighted Average TEC of Purchased Set-Top Boxes by Year



Report on Procurement Commitments

Under the Voluntary Agreement, the service providers committed that 90% of set-top boxes they purchased each year would meet applicable energy efficiency levels. In 2025, 100% of the set-top boxes they purchased met these levels. The total procurement figures for the reported categories of set-top boxes can be found in Table 2 below.

Table 2: Set-Top Box Procurement by Category in 2025

Category	Units Procured	Number Meeting Efficiency Levels	% Meeting Efficiency Levels
DVR	363,016	363,016	100%
Non-DVR (Non-IP)	0	0	N/A
Non-DVR (IP)	2,948,414	2,948,414	100%
Thin Client	604,268	604,268	100%
Total	3,915,698	3,915,698	100%

Reduction in National Energy Consumption

In 2012, the signatories developed the base case shown in Table 3 to estimate the energy consumption of set-top boxes and the number of units installed in subscriber households as of the inception of the VA.

Table 3: Base Case - 2012 Estimated Energy Consumption

Segment	Category	TEC (kWh/yr)	Units (Millions)	National Energy Consumption (TWh/yr)	500 MW Power Plant Equivalents (Rosenfelds)
Cable	DVR	282	27	7.5	2.5
	Non-DVR	139	57	7.9	2.6
	Thin Client	90	2	0.1	0.0
	DTA	39	33	1.3	0.4
Satellite	DVR	283	21	5.9	2.0
	Non-DVR	110	58	6.4	2.1
Telco	DVR	140	6	0.8	0.3
	Non-DVR	90	21	1.9	0.6
US Total		-	225	32	10.6

In this and in prior reports, the Independent Administrator used a multi-step approach to evaluate progress in reducing national set-top box energy consumption by comparing the estimated energy usage of deployed set-top boxes at the close of the reporting period with the 2012 base case. The first step is to estimate changes in set-top box stock levels. The set-top box stock levels are adjusted to account for changes in subscriber levels, which are shown in Table 4 below.

Table 4: Change in Subscribers from 2012-2025

Segment	Percent Change*						
	2012 to 2020	2020 to 2021	2021 to 2022	2022 to 2023	2023 to 2024	2024 to 2025	2012 to 2025
Cable	-17.0%	-6.4%	-7.9%	-9.9%	-9.8%	-6.8%	-45.7%
Satellite	-33.3%	-13.5%	-12.7%	-14.9%	-12.9%	-13.1%	-67.6%
Telco	-20.4%	-14.4%	-13.7%	-13.8%	-15.5%	-8.2%	-60.7%

* Based on data provided by the Steering Committee (for 2012) and service providers (for 2013-2025).

The second step assumes that newly purchased devices generally replace older (less energy-efficient) equipment from the same category rather than add to total deployed stock. Finally, Evergreen incorporates additional information received from the service providers to refine the estimates. Based on these three factors, Evergreen's estimates for total stock levels as of the end of 2025 are shown in Table 5. Over the years, this estimation has been validated through periodic comprehensive deployed inventory data provided by the signatories.

Table 5: Estimates of Total Deployed Units in the Market from 2013-2025

Category	Units (Million)*												
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
DVR	54.0	54.6	53.9	52.7	49.9	47.7	44.4	40.9	36.9	33.2	32.5	28.7	23.3
Non-DVR	130.3	122.7	112.7	96.3	92.6	89.1	83.6	77.4	80.2	74.4	62.7	56.1	49.0
Thin Client	10.6	20.3	28.8	39.8	35.0	32.4	28.6	25.2	21.8	19.0	20.7	18.0	15.7
DTA	31.6	31.5	31.4	30.9	29.7	29.1	28.7	27.5	15.7	14.5	6.6	5.9	5.8
Total	226.6	229.1	226.7	219.7	207.1	198.3	185.3	171.0	154.6	141.1	122.4	108.7	93.7

* Units are rounded for this table, but Evergreen did not round any figures when calculating the national footprint estimate.

The next step in estimating national energy consumption is to account for products procured in 2025. The signatories purchased approximately 1.24 million fewer set-top boxes in 2025 than in 2024, as shown in Table 6.

Table 6: Total Signatory Set-Top Box Units Procured in 2014 and from 2022-2025

Category	Total Units Procured					% Change from 2014 to 2025
	2014	2022	2023	2024	2025	
DVR	12,710,777	442,828	387,936	828,293	363,016	-97%
Non-DVR	18,646,064	6,315,175	4,575,852	3,849,720	2,948,414	-84%
Thin Client	9,738,163	468,853	495,948	478,018	604,268	-94%
Subtotal	46,296,336	7,300,716	5,459,736	5,156,031	3,915,698	-92%

Evergreen assumes the 2025 set-top box procurements replaced the oldest deployed units. This methodology yields multiple sets of stock (one for each purchase year) each with its own weighted average TEC values. The remaining stock estimates for each of the purchase year sets are shown in Table 7.

Multiplying the number of units purchased each year that remained in the field at the end of 2025 and the average TEC for that category of device at the time of its purchase produces the estimated national energy consumption shown in Table 7. Table 8 displays the results of this calculation year-over-year for the lifetime of the Voluntary Agreement.

Table 7: 2025 National Energy Consumption Calculation

Category	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2025 National Energy Consumption (TWh)*
DVR Purchases from Each Year Remaining in Field	0	6,629,399	6,304,346	5,848,219	1,719,840	759,555	442,828	387,936	828,293	363,016	
DVR TEC Average (kWh/yr)	161.3	142.9	138.7	134.4	144.8	146.5	143.6	128.9	115.1	117.6	3.2
Non-DVR Purchases from Each Year Remaining in Field	0	0	5,998,697	8,319,044	10,537,923	6,444,722	6,315,175	4,575,852	3,849,720	2,948,414	
Non-DVR TEC Average (kWh/yr)	85.6	90.8	91.8	74.1	49.0	42.5	44.0	31.5	26.6	20.6	2.5
Thin Client Purchases from Each Year Remaining in Field	0	303,953	6,316,550	4,592,236	1,473,453	923,849	468,853	495,948	478,018	604,268	
Thin Client TEC Average (kWh/yr)	46.9	44.3	45.4	45.4	48.0	47.6	49.1	55.8	47.1	50.5	0.7
DTA Purchases from Each Year Remaining in Field	3,662,342	1,337,930	427,480	127,850	86,959	48,240	73,860	0	0	0	
DTA TEC Average (kWh/yr)	49.9	54.9	55.8	51.2	51.4	54.9	38.2	N/A	N/A	N/A	0.3
Total 2025 National Energy Consumption (TWh)											6.8

*The deployed footprint analysis estimates there are no set-top boxes purchased prior to 2016 remaining in the field, therefore those years are not included in this table.

Table 8: National Energy Consumption of Installed Set-Top Boxes 2012-2025¹¹

	Pre-VA*	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Estimate of Total Deployed Units in the Market (Million)	225.0	226.6	229.1	226.7	219.7	207.1	198.3	185.3	171.0	154.6	140.5	122.4	108.7	93.7
National Energy Consumed (TWh/yr)	32.0	30.6	29.2	26.9	24.5	21.0	19.4	17.3	15.2	13.7	11.9	10.3	8.6	6.8
500 MW Power Plant Equivalents (Rosenfelds)	10.6	10.2	9.7	9.0	8.2	7.0	6.5	5.8	5.1	4.6	4.0	3.4	2.9	2.3
CO2 Emitted (MMT)	22.6	21.6	20.1	18.5	17.2	15.6	13.7	12.2	10.7	9.7	5.1	4.3	3.4	2.7

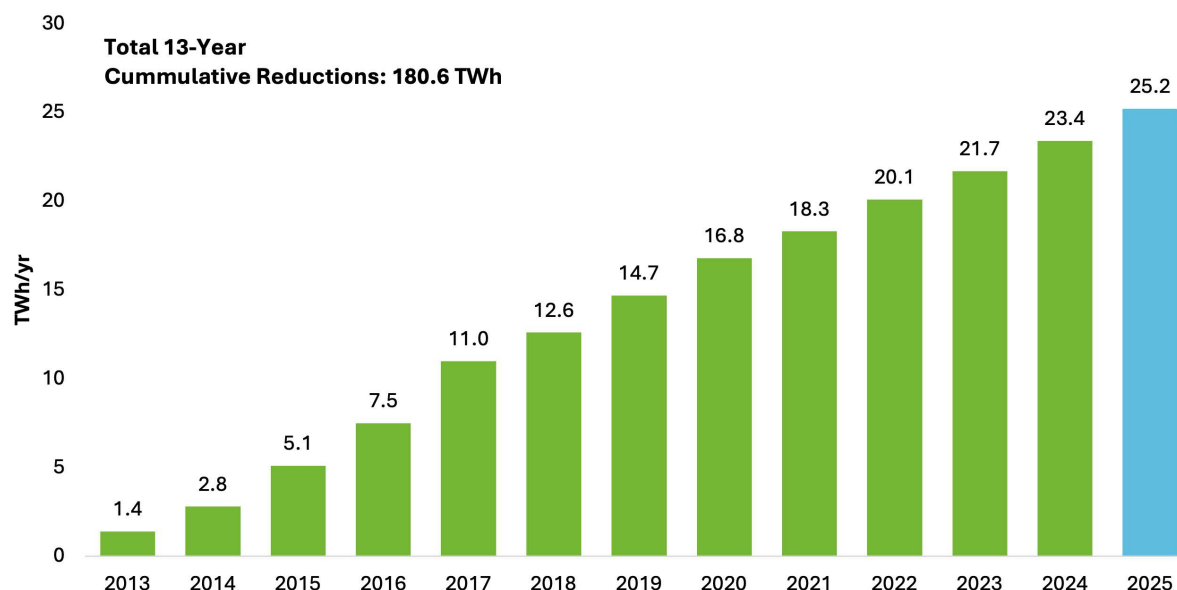
* 2012

Evergreen therefore calculates that set-top boxes consumed 6.8 TWh in 2025 compared to 32 TWh in the base case year of 2012. As shown in Figure 2 below, during the thirteen years of the Voluntary Agreement, cumulative energy consumption has declined by an estimated 180.6 TWh, which represents approximately \$26.5 billion in consumer electricity costs and 126 million metric tons of CO2 emissions. In 2025 alone, consumers spent nearly \$4.4 billion¹² less on their utility bills in 2025 and there were 16.9 million fewer metric tons of CO2 emissions from power plants than would have occurred if the power levels and volume of set-top boxes had remained unchanged from 2012 when the Voluntary Agreement was adopted.¹³

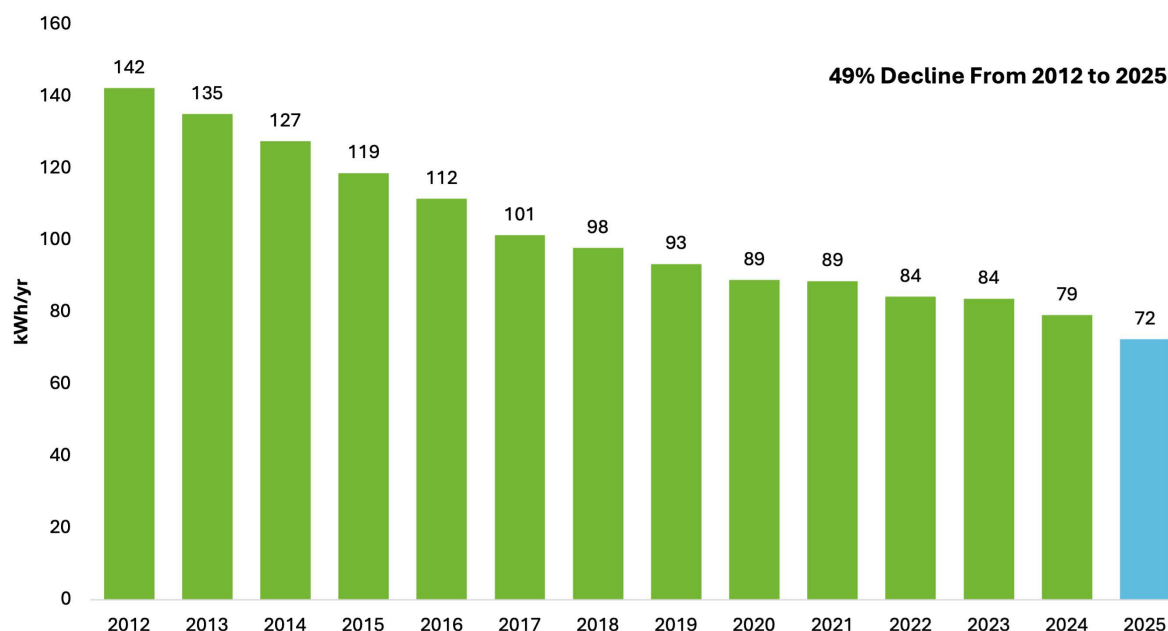
¹¹ Evergreen used EPA's GHG Calculator for its calculations. D+R's 2023 Annual Report explained how changes to EPA methodologies resulted in a larger decrease in the estimated CO2 emitted beginning in 2022. A few additional minor adjustments were made to the previous years' CO2 emitted conversions due to updates to the conversion factors used to ensure the most accurate conversion factors were used in each corresponding year as outlined in the EPA greenhouse gas equivalencies calculator revision history, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-revision-history>.

¹² U.S. Energy Information Administration, *supra* note 3.

¹³ U.S. Environmental Protection Agency, *supra* note 4.

Figure 2: Annual National Energy Reductions Compared to the Base Case

Until the 2024 report, the Independent Administrator presented all these energy reductions as savings, but as previously acknowledged, a growing part of the reduction is associated with the significant decline in the number of video subscribers that began in 2017. However, much of the reduction is fairly considered to be savings attributable to the efforts of the signatories. First, the broadband networks that have enabled consumers to replace traditional pay-TV services with video streaming alternatives were largely built by signatories. More importantly, the reduction is driven by the greatly improved energy efficiency of newer devices procured to meet the commitments of the Voluntary Agreement. The weighted average TEC of new set-top boxes has declined by 72% since the start of the Voluntary Agreement, as shown in Figure 1. Over time, the significant year-over-year decline in energy usage of new models has caused a 49% reduction in the estimated average set-top box TEC over the entire footprint of deployed set-top boxes, from 142 kWh/year to 72 kWh/year. This trend over time is documented in Figure 3 below, which divides the estimated national energy usage for each year by its estimate of the total number of deployed set-top boxes in that year.

Figure 3: Average Annual Energy Used Per Deployed Set-Top Box (kWh/yr)

The energy savings reflected in Figure 3 have been achieved through the reduced energy usage of devices purchased by service providers, independent of the impact of reduced subscribership. Evergreen has not attempted to allocate the credit for the reduction in consumption between device efficiency and reduced pay-TV subscribership; at best such an estimate would require significant speculation given that if subscribership had remained steady or increased, service providers would have purchased a greater number of newer devices that on average would have used less power. Whatever the allocation of credit, the success of the Voluntary Agreement is demonstrated by the 72% reduction in the power usage of new devices and the 79% overall reduction in the demand set-top boxes place on the nation's energy grid.

Audit and Verification

Procurement Audit

Evergreen is required to conduct an audit of one randomly selected service provider's procurement figures each year. The audit report for the 2025 reporting year is presented in Appendix C. Evergreen determined that the data submitted by the service provider for the audit is consistent with the annual report submitted by that service provider.

Verification Testing

The Voluntary Agreement prescribes third-party verification testing of models chosen by the Independent Administrator. Every model tested measured within the applicable energy efficiency levels, and 100% of the devices tested were at or below the values reported by the service providers. These results validate and support the findings in this report.



Consumer Access to Energy Efficiency Information

All service providers committed to provide subscribers and potential customers with reasonable access to energy efficiency information for set-top boxes purchased since January 1, 2014. This information makes it easier for consumers to learn about energy-efficient set-top boxes and typical set-top box energy consumption. This information is posted on company websites from the links listed in Appendix B of this annual report and at www.energy-efficiency.us, which offers a single site from which the public may conveniently link to each service provider's information, the Independent Administrator's Annual Reports, the Voluntary Agreement, and related news and information. Evergreen again confirmed that this information is readily available to the public from the links listed in Appendix B of this report.

Conclusion

All of the signatories' new set-top box purchases met the applicable energy efficiency levels of the Voluntary Agreement, and the weighted energy consumption of those new 2025 purchases was 72% lower than the typical models purchased in 2013 even as the functionality of the devices increased. Over time, the significant year-over-year declines in energy usage of new models has caused a 49% reduction in the estimated average set-top box energy usage over the entire footprint of deployed set-top boxes, from 142 kWh/year to 72 kWh/year.

As a result, by the end of 2025, set-top boxes nationwide were consuming only one-fifth of the energy they consumed in 2012 when the Voluntary Agreement began (6.8 TWh, down from 32 TWh). Consumers spent \$4.36 billion less on their utility bills and there were 16.9 million fewer metric tons of CO₂ emissions from power plants in 2025 than would have occurred if the power levels and volume of set-top boxes had remained unchanged from 2012 when the Voluntary Agreement was adopted.

This analysis has been confirmed year-by-year through independent verification testing and procurement audits. The total energy footprint of set-top boxes in customers' homes used to access pay-TV services continues to decline as a result of improved energy efficiency, declining subscribership, and consumer use of apps as an alternative to set-top boxes.

Appendix A: Set-Top Boxes Purchased by Signatories in 2025

Table 9 lists the reported typical energy consumption (TEC) for each model of set-top box purchased by service provider signatories in 2025. These values are reported TEC, rather than calculated TEC. In the Voluntary Agreement, service providers have the option to publish a “reported TEC” that rounds up calculated TEC values for reporting purposes to account for production variances. Reported TEC figures in this appendix are rounded up to the next one-tenth digit (e.g., 99.11 kWh/year would be rounded up to 99.2 kWh/year). Please note that the same model could have variances in TEC for several reasons, including differences in reported versus calculated TEC, enabling of different product features, and/or deployment of the device by service providers running different software. The Voluntary Agreement calculates the maximum TEC for a product using the base-type allowances outlined in Table 10 and the feature allowances outlined in Table 11. Table 11 also includes descriptions of the features abbreviated in Table 10 in the “Claimed Allowances” column. The Voluntary Agreement sets forth rules for claiming feature allowances, so the column for claimed allowances lists only the features used when calculating the maximum TEC for the specific product to qualify toward meeting the signatory’s commitment.

The data submitted by service providers is subject to third-party lab verification and procurement audits as described in the report. An asterisk indicates models that have been evaluated through third-party verification testing in the current year and/or in previous years under the Voluntary Agreement (all models purchased in 2025 have been successfully validated through independent verification testing).

Table 9: Set-Top Boxes Procured by Voluntary Agreement Service Provider Signatories in 2025

Service Provider	Base Type	Primary Function	Manufacturer	Model No.	Claimed Allowances	Reported Modal Power (W)		TEC (kWh/yr)	Meets VA Levels
						On	Sleep		
Charter	IP	Non-DVR	Apple	A2843*	WiFi (n) LP, WiFi (ac) LP, HEVP	2.22	1.03	20.0	Yes
	IP	Non-DVR	Sercomm	COESST11AEI*	WiFi (n) LP, WiFi (ac) LP, HEVP	2.53	1.79	21.0	Yes
	IP	Non-DVR	Sercomm	COESST11BEI*	WiFi (n) LP, WiFi (ac) LP, HEVP	3.67	2.90	31.0	Yes
Cox	IP	Non-DVR	Sercomm	SCXI11BEI XUMO*	HNI, WiFi (n) LP, WiFi (ac) LP, HEVP	2.82	2.18	27.0	Yes
DIRECTV	Satellite	DVR	DIRECTV	HR54-500*	APD (hrs), DVR, DVR-A, HNI, M-HNI, Multi-room, MS, MS-A	12.66	12.64	110.8	Yes
	Satellite	DVR	DIRECTV	HS17-500*	APD (hrs), DVR, DVR-A, M-HNI, Multi-room, MS, MS-A, XCD, WiFi (ac) HP, WiFi Addl HP(2), UHD-4	19.48	18.34	163.6	Yes

Service Provider	Base Type	Primary Function	Manufacturer	Model No.	Claimed Allowances	Reported Modal Power (W)		TEC (kWh/yr)	Meets VA Levels
						On	Sleep		
	Thin Client	Thin Client	DIRECTV	C61-500*	APD (hrs), HNI, M-HNI	5.43	4.22	40.1	Yes
	Thin Client	Thin Client	DIRECTV	C61K-700*	APD (hrs), HNI, M-HNI, HEVP, UHD-4	9.50	4.10	49.8	Yes
	Thin Client	Thin Client	DIRECTV	C61W-400*	APD (hrs), HNI, WiFi (ac) LP, WiFi Addl LP(2)	6.53	5.03	47.9	Yes
	Thin Client	Thin Client	DIRECTV	C71KW-400 (GEM)*	HNI, WiFi (ac) LP, WiFi Addl LP(2), HEVP, UHD-4	6.69	5.91	58.0	Yes
DISH	Satellite	DVR	Dish	Hopper 3*	APD (hrs), Adv Video-A, DVR, DVR-A(2), M-HNI, Multi-room, MS, MS-A(2), XCD, XCD-A, WiFi (n) LP, HEVP, UHD-4	24.43	23.28	207.0	Yes
Optimum (formerly Altice USA)	IP	Non-DVR	Sagemcom	CS 50001*	HNI, WiFi (n) LP, WiFi (ac) LP, HEVP	2.65	2.28	22.0	Yes
Verizon	IP	Non-DVR	Sercomm	SC-SIP03*	APD (hrs), WiFi (n) LP, WiFi (ac) LP, HEVP, UHD-4	5.79	2.95	33.0	Yes
	Cable	DVR	Vantiva	4100P2*	APD (hrs), Adv Video-A, DVR, M-HNI, Multi-room, MS, MS-A, XCD, XCD-A, HEVP, UHD-4	19.70	15.50	147.0	Yes
	Cable	DVR	Vantiva	4100ATV*	Adv Video-A, DVR, M-HNI, Multi-room, MS, MS-A, XCD, XCD-A, HEVP, UHD-4	10.92	10.92	96.0	Yes
	IP	Non-DVR	Vantiva	F3544K49203*	APD (hrs), WiFi (n) LP, WiFi (ac) LP, HEVP, UHD-4	3.91	2.27	24.0	Yes
	IP	DVR	WNC	JS7E*	DVR, DVR-A, HNI, Multi-room, MS, HEVP, UHD-4	6.72	6.72	60.0	Yes

Table 10: Set-Top Box Base Allowances

Base Type (Topmost if multiple apply)	Tier 4 Allowances (kWh/yr)
DTA	40
Cable (CBL)	45
Satellite (SAT)	50
Internet Protocol (IP)	15
Thin Client (TC)	25

Table 11 sets forth the features listed for set-top boxes and their feature allowances under Tier 4.

Table 11: Set-Top Box Feature Allowances

Feature	Description	Tier 4 TEC Allowances (kWh/yr)
Adv Video-A	Advanced Video Processing	8
APD*	Automatic Power Down (4 hrs)	-
DVR	Digital Video Recorder (DVR)	15
DVR-A	DVR Additional	10
HEVP	High Efficiency Video Processing	10
HNI	Home Network Interface	10
M-HNI	MoCA HNI	12
MS	Multi-stream	8
MS-A	Multi-stream Additional	8
Multi-room	Multi-room	20
UHD-4	Ultra High Definition - 4K	5
WiFi (ac) HP	WiFi (ac) HP	20
WiFi (ac) LP	WiFi (ac) LP	16
WiFi (n) LP	WiFi (n) LP	9
WiFi Addl HP	WiFi above 2x2 HP	3
WiFi Addl LP	WiFi above 2x2 LP	3
XCD	Transcoding Base	13
XCD-A	Transcoding Additional	5

* APD (Automatic Power Down) is used to calculate TEC but does not have a specific allowance.

Appendix B: Consumer Access to Set-Top Box Energy Efficiency Information

Set-top box energy information for consumers is available at www.energy-efficiency.us, and for each service provider at the links below.

Table 12: Links for Consumer Access to Energy Efficiency Information

Service Provider	Consumer Information Location
Charter	https://www.spectrum.net/support/internet/energy-usage-your-charter-equipment
Comcast	https://www.xfinity.com/support/articles/set-top-box-energy-usage
Cox Communications	https://energy.cablelabs.com/cox/
DIRECTV	https://www.directv.com/support/satellite/article/000082048
DISH	https://support.dish.com/products/receivers/energy-efficiency
Frontier	https://content.frontier.com/-/media/documents/helpcenter/tv/fiber-tv/set-top-box-equipment-efficiency.pdf
Optimum	https://energy.cablelabs.com/optimum/
Verizon	https://www.verizon.com/support/residential/tv/equipment/stb-dvr

Appendix C: 2025 Procurement Audit Report

The Voluntary Agreement requires the service providers to submit annual procurement data to an Independent Administrator, which collects and analyzes the data, then publishes the findings in an annual report. Data from the individual service providers are aggregated for publication in the annual report to protect this highly confidential information. To verify the accuracy of the reported procurement data, the Voluntary Agreement requires a random audit of one service provider each year. In accordance with the confidentiality requirements of the Voluntary Agreement, the name of the service provider is not published.

Evergreen conducted an audit of the 2025 procurement data, which was used to develop the findings published in the 2025 Annual Report. Evergreen randomly selected the service provider by creating an Excel spreadsheet and using the “random” function, after excluding the signatory that was successfully audited last year in accordance with the terms of the Voluntary Agreement.

Evergreen requested raw data from the selected service provider to verify the procurement data submitted, which included invoice data and specification sheets. Evergreen determined that the data submitted by the service provider for the audit is consistent with the annual report submitted by that service provider.