



2014 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 signed the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes (<http://www.ncta.com/energyagreement>) with the goal of increasing energy efficiency of set-top boxes while protecting rapid innovation and timely introduction of new features. Signatories include 11 cable, satellite, and telco service providers serving 92.68 million U.S. video subscribers, accounting for 91.8% of the market in 2014. In 2013, leading energy-efficiency advocates joined with the pay television industry in an expanded version of the Voluntary Agreement.

One of the requirements of the Voluntary Agreement is publication of an annual report. This report provides a summary of developments for the last calendar year. The first annual report was published on August 15, 2014. This is the second annual report published under the Voluntary Agreement.

Under the Voluntary Agreement, 90% of set-top boxes procured by service providers after December 31, 2013 must meet the efficiency standards established for ENERGY STAR[®] Version 3.0, referred to as the “Tier 1” requirements of the Voluntary Agreement. After December 31, 2016, 90% of set-top boxes procured by participants must meet more-efficient standards (referred to as “Tier 2”).

In 2014, with the procurement commitments in effect, 95% of service providers’ set-top box purchases met the ENERGY STAR Version 3.0 or Tier 1 standards, thereby meeting the requirements in the Voluntary Agreement.¹ Service providers also reported early adoption of Tier 2² performance levels in 62.4% of set-top boxes procured in 2014, an improvement from the 47% reported in 2013. Progress towards the Tier 2 performance is a positive indicator. However, the set-top boxes purchased in January 2017 will likely have significantly increased functionality compared to products reported in 2014. These features may consume more energy, potentially making achievement of the Tier 2 requirement more challenging.

The procurement of energy-efficient set-top boxes under the Voluntary Agreement has resulted in a substantial decrease in the average energy consumption by the major types of set-top boxes.³

¹ Based on 2014 procurement data submitted by service providers to D+R International, Ltd.

² Products indicating Tier 2 performance have been tested using Tier 1 (ENERGY STAR Version 3.0) test procedures. The Voluntary Agreement does not require the use of Tier 2 test procedures until 2017.

³ A more detailed presentation of this data is in Table 1 below.

Table ES-1 Weighted Total Energy Consumption (TEC) Average of Set-Top Boxes Purchased in 2013 and 2014

Category	2012 Weighted Average	2013 Weighted Average	2014 Weighted Average	Percent Change in Weighted Average Energy Consumption 2012 to 2014
DVR	267	195	179	-33%
Non-DVR	119	109	103	-13%
Thin Client	90	51	50	-44%
DTA	39	50	49	26% ⁴

Based on the improved energy efficiency of the set-top boxes procured in 2014, it is estimated that the Voluntary Agreement reduced national set-top box energy consumption from 32 TWh in 2012 to 30.6 TWh in 2013 to 29.2 TWh in 2014, a reduction of 8.75% even as deployed stock is believed to have increased.⁵ This 2.8 TWh reduction represents consumer savings of approximately \$336 million⁶ and prevented 1.9 million metric tons of CO₂ emissions last year alone.⁷ Over the first two years of the Voluntary Agreement, energy consumption is estimated to have been reduced by 4.2 TWh, saving consumers approximately \$504 million and avoiding 2.9 million metric tons of CO₂ emissions.⁸ The energy savings and CO₂ emissions reductions are even larger when compared to estimates based on the projected unabated proliferation of digital video recorders (DVRs) in the absence of the Voluntary Agreement.⁹ Against those estimates, the improved energy efficiency of the set-top boxes procured in 2014 reduced the rate of national set-top box energy consumption from 35.0 TWh/year to 29.2 TWh/year, avoiding 5.8 TWh in national electricity consumption in 2015. This 16.6% reduction represents an annual consumer savings of approximately \$696 million¹⁰ and prevented 4.0 million metric tons of CO₂ emissions.¹¹ The two-year estimated savings using this methodology is 8.7 TWh, which saved

⁴ Most DTAs purchased in 2013 and 2014 included HD and advanced video processing (AVP) capability which increased energy usage, but 100% of the models purchased in 2014 still met the Tier 1 (ENERGY STAR Version 3.0) energy efficiency standards.

⁵ Estimated stock calculated using the change in subscribership from 2012-2014.

⁶ Based on national average energy cost of \$0.12 per kWh (April 27, 2015). *Electric Power Monthly*. Retrieved May 8, 2015, from U.S. Energy Information Administration, available at http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_3.

⁷ Emission reductions in this report are based upon the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator, available at <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>.

⁸ See D+R International, 2013 Annual Report, Voluntary Agreement for the Energy Efficiency of Set-Top Boxes (2013 Annual Report) at 14 (estimating 1.4 TWh reduction in energy usage). The emissions reductions estimated in the 2013 Annual Report have been recalculated using the EPA's Greenhouse Gas Equivalencies Calculator; see *supra* note 7.

⁹ This scenario assumes that the national energy consumption in 2012 was 32 TWh per year and in 2023 would be 47 TWh per year after 10 years with no Voluntary Agreement in place. The calculations assume a yearly growth rate of 1.5 TWh per year.

¹⁰ See *supra* note 6.

¹¹ See *supra* note 7.

consumers approximately \$1.04 billion with a prevention of 6.0 million metric tons of CO₂ emissions.¹²

The Voluntary Agreement also contains additional commitments. A high-level summary of these commitments and the progress made to date on each is presented below.

Light Sleep. Cable signatories committed to continuing to deploy software updates enabling light sleep for certain models of set-top boxes already in homes and to deploying new set-top boxes with light sleep capabilities. All cable signatories reported meeting these commitments. Two telco signatories committed to adding a light sleep feature to their DVR set-top boxes; both reported meeting this commitment. One telco service provider has not been able to implement light sleep to previously deployed set-top boxes without substantially degrading the customer experience; however, that service provider has expressed its continued commitment to pursuing innovative solutions that reduce the energy consumption of set-top boxes during periods of inactivity. Light sleep is not required for these set-top boxes to meet the Tier 1 requirements.

Automatic Power Down. The satellite signatories committed to including automatic power down (APD) in at least 90% of set-top boxes purchased after January 1, 2013; they both reported meeting this commitment.

Whole-Home Systems. Whole-home systems can result in lower overall household set-top box energy use as homes can receive DVR capabilities on all TVs without requiring a DVR on each one. Instead, a thin client or other set-top box consuming less energy is used on the second and third TVs in the home. The satellite signatories committed to making whole-home systems available to all subscribers in 2013; they both met this commitment. Telco Internet Protocol television (IPTV) providers made similar commitments and provided whole-home capability for every household with a DVR in 2014. Although not required by the Voluntary Agreement, cable operators have also deployed whole-home solutions.

Next-Generation Set-Top Boxes. The cable operator signatories committed to beginning field tests of set-top boxes that include next-generation power management by December 31, 2014. Next-generation power management allows parts of the device to operate in a reduced power consumption mode while still functioning with cable system architectures and meeting consumer expectations for quick start-up time and other required functions. As noted below, trials commenced in 2014 and remain underway in 2015.

Consumer-Facing Energy Efficiency Information. Each service provider committed to providing reasonable access to energy efficiency information for set-top boxes purchased after January 1, 2014, and all service providers met this commitment.

Annual Procurement Data. All service providers submitted their annual procurement reports to the Independent Administrator on time.

Field Verification. Beginning in 2014, the Voluntary Agreement requires annual field verification of new set-top box models counted toward the procurement commitments in 80-100 customer homes, at least 12% of which shall be in California. Intertek Testing Services, NA Inc. conducted the testing. Intertek tested a representative group of 94 set-top boxes in 85 homes

¹² See 2013 Annual Report at 14-15 (estimating 2.9 TWh reduction in energy usage).

located in the New York City, Los Angeles, Washington, and Denver metropolitan areas between August and October 2014. More than 12% of these homes were located in California. The set-top boxes were tested in both “on” and “standby” modes. To account for potential variability of conditions within a home, the Steering Committee adopted tolerance levels by which a set-top box’s field test result may exceed a reported or permitted energy level. The adopted tolerance levels are the lower of 10% or 20 kWh/year for set-top boxes with an on-power mode of at least 10W, and 10 kWh/year for lower-power devices. With these tolerances applied, the test results confirmed that the energy usage of service providers’ set-top boxes in the home is consistent with the energy information provided to consumers and is in substantial compliance with the procurement commitments of the Voluntary Agreement.

Random Audit. The Independent Auditor is required to conduct a random audit of one service provider’s procurement figures each year. D+R conducted an audit of one service provider’s 2013 procurements and another service provider’s 2014 procurements. D+R randomly selected the service providers and reviewed their raw procurement data, invoice data, purchase order data, product specification sheets, and screenshots from their purchase order systems. After cross-checking these datasets, D+R concluded that the percentage of set-top boxes procured by the service providers during the audit period meeting ENERGY STAR Version 3.0 (Tier 1) was above the 90% threshold established by the Voluntary Agreement (the 90% procurement commitment did not apply in 2013, but the audited provider nonetheless met that target).

Overview of the Voluntary Agreement

Cable, satellite, and telco service providers offer pay television to approximately 101 million U.S. households using customer premises equipment, often referred to as set-top boxes.¹³ Each device contains hardware and software to receive television programming and related services from service providers and process them 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 operate as highly specialized components, and the devices change frequently as the service providers introduce new services.

All set-top boxes have one thing in common: they require power to operate. In aggregate, set-top boxes consumed an estimated 31 TWh of electricity in 2013, 18 percent of all residential consumer electronics electricity consumption, and 2.2% of all residential electricity consumption.¹⁴ To leverage the configuration of the set-top box industry to reduce the amount of energy consumed by set-top boxes while protecting rapid innovation and timely introduction of new features, the pay television industry crafted the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes (<http://www.ncta.com/energyagreement>) in 2012. The 15 industry leaders who signed the original Voluntary Agreement represent all of the major service providers, equipment vendors, and industry organizations in the United States. Combined, these companies served 92.68 million American households in 2014, accounting for 91.8% of all multichannel video consumers.¹⁵ The Voluntary Agreement provides a framework for the pay television industry to deliver market-based energy efficiency gains that keep pace with technological innovation.

¹³ Based on data provided by the National Cable & Telecommunications Association and the Consumer Electronics Association.

¹⁴ Urban, Bryan, Shmakova, Victoria, Lim, Brian, Roth, Kurt. 2014. *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.

¹⁵ Ibid.

After extensive negotiations among the initial signatories and energy-efficiency advocates, an expanded Voluntary Agreement that included new signatories was created in 2013. The U.S. Department of Energy (DOE), the Natural Resources Defense Council (NRDC), the American Council for an Energy-Efficient Economy (ACEEE), the Appliance Standards Awareness Project (ASAP), the Consumer Electronics Association (CEA), and the National Cable & Telecommunications Association (NCTA) announced this expansion in December 2013. The revised Voluntary Agreement includes additional energy efficiency commitments, coverage of whole-home multifunction gateway devices, expanded provisions for transparency and accountability, and participation by energy-efficiency advocates in the Steering Committee for the Voluntary Agreement.

Voluntary Agreement Objectives

The objectives of the Voluntary Agreement are to continue improvements in the energy efficiency of set-top boxes and to foster device and service functionality while encouraging innovation and competition. By continuing to increase set-top box energy efficiency, the Voluntary Agreement also aims to further reduce potential environmental impacts and increase benefits to consumers. To ensure that these objectives are met, the Voluntary Agreement states that energy efficiency improvements should not jeopardize the intended uses and functionalities of set-top boxes or create undue burdens or competitive disadvantages compared with other means of distributing video programming or other programming services. Further, energy efficiency improvements are expected to preserve or enhance the customer experience and be sufficiently flexible to adapt to technological options and market competition while also improving functionality, offering service enhancements, and fostering rapid innovation.

As fully realized, the signatories have estimated that the Voluntary Agreement will result in significant consumer savings in at least three ways:

- *By increasing the energy efficiency of set-top boxes.* Once set-top boxes meet the Tier 2 levels, consumers will save at least \$1 billion annually in energy costs compared to the set-top boxes in use in 2012. These energy savings are equivalent to almost as much power as that generated by three average power plants (500 MW each) annually and will prevent 5 million metric tons of CO₂ emissions per year.
- *By meeting increasing consumer demand for digital video recorder (DVR) and high-definition (HD) functionality with more energy-efficient set-top boxes.* The potential rise in consumer demand for DVR and HD set-top boxes with many features could have led to the need for five additional power plants, as demonstrated by the difference in energy consumption between the two base cases. That additional energy consumption is eliminated under the Tier 2 efficiency levels of the enhanced Voluntary Agreement.
- *By shifting away from a DVR for each TV to the use of whole-home set-top boxes that share content with other TVs in the home.* With the installation of whole-home systems, the second, third, and any additional TVs use a non-DVR set-top box or thin client, both of which use considerably less energy than a DVR. Whole-home technology has the potential to save consumers another \$1 billion per year in energy bills, save energy equivalent to three power plants, and prevent the emission of 5 million metric tons of CO₂ per year.

To achieve these objectives, the Voluntary Agreement established commitments for the pay television industry through 2017.

Voluntary Agreement Signatories and Steering Committee

The current signatories and participants in the Voluntary Agreement are listed below. Each signatory and participant organization marked with an asterisk has one voting member serving

on the Steering Committee; each signatory and participant organization marked with a dagger has one representative who participates on the Steering Committee as a non-voting observer.

Energy Efficiency Advocates

- ACEEE*
- ASAP[†]
- NRDC*

Cable Service Providers

- Comcast*
- Time Warner Cable*
- Cox Communications*
- Charter Communications*
- Cablevision*
- Bright House Networks*

Satellite Service Providers

- DIRECTV*
- DISH Network*

Telco Service Providers

- AT&T*
- Verizon*
- CenturyLink*

Other Organizations

- Cisco*
- ARRIS*
- Pace[†]
- EchoStar Technologies
- NCTA*
- CEA*

The composition of the Steering Committee allows the Voluntary Agreement to offer a multi-stakeholder approach, while permitting rapid adjustments as the technological landscape changes.

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 and Auditor in 2013. D+R International continued in this role in 2014. This report is the second annual report.

The Voluntary Agreement required that the Steering Committee meet at least quarterly in 2014. The Steering Committee met four times in 2014 (February 25, June 19, July 24, December 4), and subcommittees were also active during the year. The Steering Committee is obligated to meet periodically on a mutually agreed timetable in 2015 and is meeting this obligation.

In 2014, in accordance with its commitments, Steering Committee representatives provided updates to the U.S. Department of Energy, the U.S. Environmental Protection Agency, state regulatory authorities, and other stakeholders regarding the implementation of the Voluntary Agreement. Representatives of the service providers and equipment providers met with the White House Council on Environmental Quality and policymakers on Capitol Hill.

Additional responsibilities of the Steering Committee include the following:

- Managing the Voluntary Agreement
- Hiring and managing the Independent Administrator, Independent Auditor, and field verification contractor
- Reviewing proposals for energy allowances based on new features, which the Steering Committee can approve, reject, or add to the Voluntary Agreement as appropriate
- Evaluating the effectiveness of the Voluntary Agreement in achieving its purposes
- Adopting new or revised efficiency measures, courses of action, and amendments to the Voluntary Agreement as technologies advance

CEA and NCTA are required to provide the following two reports to the Independent Administrator, both of which they provided on time in 2015:

- The estimated total number of U.S. residential multichannel video subscribers and the number served by service providers participating in the Voluntary Agreement during the reporting period (due by April 1 of each year, beginning in 2014)
- Information on progress with respect to other energy efficiency commitments (due by May 1 of each year, beginning in 2014)

Service Provider Commitments

The primary service provider commitment is to procure energy-efficient set-top boxes. Specifically, 90% of set-top boxes purchased after December 31, 2013 shall meet the efficiency standards established for ENERGY STAR Version 3.0, or Tier 1. After December 31, 2016, the Voluntary Agreement designates a new, more stringent efficiency level, designated as Tier 2.¹⁶ The procurement level requirement under Tier 2 is also 90%. Progress on these commitments is discussed in “Progress on Procurement Commitments,” below. Service providers also made commitments relating to light sleep, automatic power down, whole-home systems, field testing of set-top boxes that include next-generation power management, other energy-saving strategies, and public posting of energy efficiency information for consumers. Additional information on these commitments is outlined in “Progress on Other Energy Efficiency Commitments,” below. All service provider commitments are outlined in “Appendix A: Voluntary Agreement Commitments.”

Independent Administrator and Auditor Role

The Independent Administrator and Auditor (or Independent Administrator) is a third party appointed and overseen by the Steering Committee. Under the Voluntary Agreement, the Independent Administrator must aggregate and compile confidential procurement data submitted by service providers and provide a draft report to the Steering Committee by May 31 of each year. With the service provider commitments in effect, the Independent Administrator must also assess whether there is substantial compliance with the service provider procurement commitments. If these commitments are not met, the Independent Administrator has the authority to take appropriate action following the procedures set out in the Voluntary Agreement.

The Independent Administrator has committed to conducting a random audit of one service provider's procurement figures each year. The results of the 2013 audit were not available when the 2013 report was published; the final 2013 audit report is presented in Appendix D-1. The final 2014 audit report is presented in Appendix D-2.

Field Verification

The Steering Committee selected Intertek Testing Services, NA Inc. to perform field verification of the energy usage of selected set-top boxes in 80-100 homes per year to ensure set-top boxes are performing as reported, beginning in 2014. The first round of field verification testing was conducted between August and October 2014, with 94 set-top boxes tested in 85 homes in the New York City, Los Angeles, Washington, and Denver metropolitan areas. The test results submitted by Intertek to D+R confirmed that the energy usage of service providers' set-top boxes in the home is consistent with the energy information provided to consumers and is in substantial compliance with the procurement commitments of the Voluntary Agreement, with allowances for expected variability of conditions within a home.

¹⁶ Tier 2 allowances are similar to ENERGY STAR Version 4.1.

The objective of the Field Verification testing is to compare usage in homes to the modal power and annual energy use values reported by the Service Providers to the Independent Administrator. The data provided by Intertek showed that, in aggregate, the test results were almost identical to the TEC values reported by the service providers in their 2013 annual reports, but individual devices frequently tested slightly below or above the reported amounts. Upon further study, the Steering Committee determined that a tolerance above reported TEC levels is warranted to account for potential variability of conditions within a home. The Steering Committee adopted a tolerance of the lower of 10% or 20 kWh/year for set-top boxes with an on-power mode of at least 10W, and 10 kWh/year for lower-power set-top boxes. After reviewing the test results and application of these tolerance levels, D+R found that none of the tested set-top boxes that were counted as Tier-1 compliant for the 2014 procurement commitment exceeded the Tier 1 Maximum Allowable TEC when tested in the field. After the tolerance levels were applied, three models exceeded the energy usage values posted on service provider websites, but none by more than 5 kWh/year. Based on these results, one service provider revised the energy usage figure for that model on its website and in its 2014 annual report, and the other two models remain under study and will be retested in the field in 2015.

Increased Energy Efficiency of Set-Top Boxes

Table 1 highlights the progress made by the signatories toward increased energy efficiency for each set-top box product category.

Table 1: Weighted Average Typical Electricity Consumption for Major Set-Top Box Categories

Category	TEC (kWh/yr)			Percent Change in Weighted Averaged 2012 to 2013	Percent Change in Weighted Averaged 2013 to 2014	Percent Change in Weighted Averaged 2012 to 2014
	2012 Base Case	2013 Procurement Data	2014 Procurement Data			
	Weighted Average	Weighted Average	Weighted Average			
DVR	267	195.4	179.4	-27%	-8%	-33%
Non-DVR	119	108.6	103.3	-9%	-5%	-13%
Thin Client	90	51.4	50.0	-43%	-3%	-44%
Multi-Service Gateway	N/A	219.0	219.0	N/A	0%	N/A
DTA ^b	39	57.6	49.3	48% ^c	-14%	26% ^c

^a Thin clients were available only from cable service providers at the time of the 2012 base case. 2013 and 2014 reports include thin clients from non-cable service providers.

^b A digital transport adapter (DTA), is a minimally configured unidirectional set-top box without recording functionality that can receive and decode video content as delivered from a coaxial or hybrid fiber coaxial system.

^c Most DTAs purchased in 2013 and 2014 likely included HD and advanced video processing (AVP) capabilities, both of which increase TEC. DTAs offered before 2013 were less likely to include these features. At the same time, 91% of DTAs purchased in 2013 and 100% of those purchased in 2014 met the Tier 1 (ENERGY STAR Version 3.0) energy efficiency requirements.

Progress on Procurement Commitments

Under the Voluntary Agreement, 90% of set-top boxes procured by participants after December 31, 2013 must meet the efficiency standards established for ENERGY STAR Version 3.0 (Tier 1). This is the second year in which the procurement commitment has been evaluated, but the first in which the procurement commitment is in force. All service providers who signed the

Voluntary Agreement submitted procurement data for 2014 on time. These providers are Bright House Networks, LLC, Cablevision Systems Corp., Charter Communications, Inc., Comcast Cable Communications, LLC, Cox Communications, Inc., Time Warner Cable Inc., AT&T Services, Inc., CenturyTel Broadband Services, LLC (d/b/a CenturyLink), Verizon Communications, Inc., DIRECTV, LLC, and DISH Network LLC. Details about the set-top boxes purchased by these providers are provided in Appendix B: Set-Top Boxes Purchased by Voluntary Agreement Signatories in 2014. Of the eleven service providers, only one did not meet the 90% procurement requirement in 2014. One of that service provider's primary set-top boxes unexpectedly did not meet the Tier 1 standard. However, after a successful software update in January 2015 improved the device's energy efficiency, the model does now meet the Tier 1 standards. In accordance with the Voluntary Agreement and the Operating Procedures previously adopted by the Steering Committee, the Independent Administrator developed a remedial plan with that service provider that is currently under review by a panel of Steering Committee members that includes an Energy Advocate representative. The Independent Administrator will monitor and measure the provider's compliance with the terms of the approved remedial plan. As of June 2015, approximately 95% of the service provider's 2015 set-top box purchases have met the Tier 1 standards.

Overall, service providers met their commitment to have more than 90% of purchased units meet the ENERGY STAR Version 3.0 (Tier 1), as shown in Table 2. The overall percentage of units meeting the ENERGY STAR Version 3.0 (Tier 1) commitment rose from 85% in 2013 to 95% in 2014.

Table 2: 2013 and 2014 Voluntary Agreement Signatory Set-Top Box Procurement

Category	Units		Percent Meeting ENERGY STAR Version 3.0 Levels (Tier 1)
	Total Procured	Number Meeting ENERGY STAR Version 3.0 Levels (Tier 1)	
DVR	12,209,976	8,690,001	71%
	12,710,777	11,267,511	89%
Non-DVR	12,360,006	10,857,191	88%
	18,646,064	17,777,790	95%
Thin Client	8,994,794	8,994,794	100%
	9,738,163	9,738,163	100%
Multi-Service Gateway	232	–	0%
	–	–	N/A
DTA	1,334,238	1,217,148	91%
	5,201,332	5,201,332	100%
Totals	34,899,246	29,759,134	85%
	46,296,336	43,984,796	95%

2013 2014

Service providers committed to having 90% procurement of set-top boxes meet Tier 2 after December 31, 2016. Although Tier 2 procurement commitments are not yet in effect,

participants have been encouraged to accelerate adoption. Based on the data provided by service providers, an estimated 62.4% of set-top boxes purchased in 2014 meet Tier 2 performance levels, an increase from 47% in 2013.¹⁷ Product types included in this percentage are DVRs, digital transport adapters (DTAs), non-DVRs, and thin clients. This progress toward Tier 2 performance should be balanced against the expectation that set-top boxes purchased closer to the Tier 2 effective date in January 2017 may have significant increased functionality and energy demands over products reported in 2014. For example, new products may include ultra-HD resolutions, more advanced video compression capability, increased recording capacities, and increased processing power, all of which may increase energy demands.

To accommodate the introduction of new set-top box features, the Voluntary Agreement allows service providers to demonstrate compliance using custom allowances for features or capabilities that are not included in current allowances. The Steering Committee can, at its discretion, propose appropriate allowances based on these requests. In 2014, no service providers made energy allowance proposals to the Steering Committee.

Pursuant to the Voluntary Agreement, in June 2015 the Steering Committee reviewed the Additional Functionality TEC Allowance for DOCSIS 3.0 8x4 mode and greater and determined that it should retain the existing allowance and review it again before the end of 2016.

Progress on Other Energy Efficiency Commitments

The Voluntary Agreement established other energy efficiency commitments, some of which are specific to certain industries or providers.

Light Sleep

Light sleep is the capability to reduce energy consumption of the set-top box during extended periods of inactivity (typically four hours) or at specific times. The cable operator signatories committed to continue the deployment of software updates enabling light sleep to certain models of deployed DVRs that were placed in service prior to the Effective Date of the Voluntary Agreement and are capable of implementing light sleep with commercially reasonable efforts. These software updates reduced set-top box TEC, because the set-top boxes enter a lower-power mode when not being used. The resulting energy savings are reflected in the energy consumption figures provided in the service provider annual reports.

In the data submitted for the 2013 annual report, cable operators reported that by the end of 2013, they had downloaded light sleep capability to approximately 14.3 million set-top boxes. In 2014, cable operators downloaded light sleep capability to an additional 6.8 million set-top boxes, for a total of 21.1 million set-top boxes with light sleep capability.

Two telephone signatories' DVR set-top boxes include a light sleep feature in which the hard disk drive stops spinning during periods of inactivity. One telco service provider has not been able to implement light sleep to previously deployed set-top boxes without substantially degrading the customer experience; however, that service provider has expressed its continued commitment to pursuing innovative solutions that reduce the energy consumption of set-top boxes during periods of inactivity.

Automatic Power Down

Automatic power down (APD) monitors parameters related to viewing and user activity. If the parameters indicate that no user activity or viewing is occurring, APD enables the device to

¹⁷ Products indicating Tier 2 performance have been tested using Tier 1 (ENERGY STAR Version 3.0) test procedures. The Voluntary Agreement does not require the use of Tier 2 test procedures until 2017.

transition to an off or sleep mode. The two satellite signatories – DISH and DIRECTV – committed that, effective January 1, 2013, at least 90% of new set-top boxes purchased will include an APD feature with a default value of four hours or less. In 2014, 100% of the set-top boxes purchased by DISH and DIRECTV were reported to meet this requirement.

Whole-Home Systems

Whole-home set-top boxes use home network interfaces (HNIs) to share content with other video client devices over a high-bandwidth home network. HNIs enable consumers to receive the following functions while consuming a fraction of the energy required by stand-alone fully featured set-top boxes with built-in tuners and DVRs:

- Shared DVR functionality to set-top boxes without DVR capability
- Transcoding to serve a variety of customer-owned video devices
- Channel tuning capabilities to thin client devices that do not need to connect directly to the service provider's headend

The satellite signatories committed to making energy-efficient whole-home servers and clients available to all current and new subscribers in 2013. Each did so. In 2013 and 2014, DIRECTV and DISH offered nationwide availability of their DIRECTV “Genie” (www.DIRECTV.com/genie) and DISH “Hopper” and “Joey” (<http://www.dish.com/hopper>) whole-home DVR servers and clients, and these energy-saving devices have been widely adopted by consumers. DIRECTV's whole-home solution reduces energy consumption by more than 40 percent relative to the ENERGY STAR certified three-room whole-home architecture DIRECTV offered just a few years ago.

AT&T and CenturyLink made similar commitments to deploy energy-efficient whole-home DVRs. During 2014, they provided whole-home DVR capability for all of their subscriber households equipped with a DVR. More information about AT&T's whole-home DVR service is available at <https://www.att.com/shop/u-verse/total-home-dvr.html> and details about the CenturyLink whole-home DVR service can be found at <http://www.centurylink.com/prismtv>. Verizon committed to offering and deploying whole-home service and clients as appropriate and, in April 2014, the company launched the FiOS Quantum whole-home system. Information about this system is available at <http://www.verizon.com/home/fiosquantumtv>.

Although not required by the Voluntary Agreement, cable operators have also deployed new whole-home solutions. For example, more than 1.7 million Comcast customers have both an X1 DVR and additional Comcast set-top boxes, which enables them to use the X1 whole-home capabilities to perform recording and playback functions from their non-DVRs rather than needing additional DVRs. Time Warner Cable has equipped millions of its deployed set-top boxes with multimedia over coax (MoCA), which makes them capable of supporting whole-home DVR functionality. Cox increased the number of new whole-home installations by nearly 50% in 2014 over 2013.

Consumer-Facing 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. All providers have met this commitment, and this information has been posted and is available to consumers as shown in Appendix C. However, in some cases, this information was difficult to locate. Service providers have been working to enhance the accessibility of such information on their websites, for example by optimizing related terms in their search tools.

Next-Generation Set-Top Boxes

The cable operator signatories committed to begin field tests of set-top boxes that include next-generation power management by December 31, 2014. Next-generation power management allows parts of the device to operate in a reduced-power consumption mode while still working with cable system architectures and meeting consumer expectations for quick start-up time and other required functions. Four cable signatories commenced trials in 2014 and two others intend to begin trials in 2015. To protect confidentiality, in mid-2015, each cable service signatory individually met with the energy-efficiency advocate signatories to provide qualitative briefings on its current plans and progress achieved to date. The energy-efficiency advocates have indicated their satisfaction with the briefings and their interest in future updates on the cable service signatories' progress on this commitment.

Other Energy-Saving Strategies

In addition to the commitments described above, signatories will evaluate other ways to save energy. For example, Verizon has implemented a dormant/off mode for selected components in its whole-home FiOS Quantum system when not in use. CenturyLink sought input from vendors on energy-saving features, including deep sleep, as it selects next-generation set-top boxes for availability to customers. Comcast launched a cloud DVR service that enables its customers to record and watch recorded programming on client and retail devices without an energy-consuming hard disk drive in the home.

Viewing Without Set-Top Boxes

The signatories continue to enable their customers to watch video programming without the use of set-top boxes at all. Consumers have downloaded more than 51 million multichannel video programming distributor (MVPD) apps for viewing MVPD programming on tablets, smartphones, game consoles, PCs, Smart TVs and other devices as described in the 2013 report, all without the use of a set-top box.¹⁸ Year-over-year viewing of online TV video content grew by 388% from June 2013 to June 2014.¹⁹ A 2014 industry report found that 70% of video watched on tablets is long-form content of more than ten minutes, and mobile and tablets together accounted for more than 38% of time played, a 114% increase from 2013.²⁰ Viewing on mobile and tablet devices has become so significant that Nielsen is adjusting its audience measurement methodologies to account for it.²¹ Though there is rapid growth in viewing without set-top boxes, the television remains the primary device of choice for consuming content across all demographics.²² While these trends are relevant to the energy use involved in pay-TV video entertainment, estimating the energy implications is beyond the scope of the Voluntary Agreement and this annual report.

¹⁸ See <http://xyo.net> (each app entered separately for each platform (Android, iPhone, etc.) to calculate the total number of app downloads).

¹⁹ Adobe, *U.S. Digital Video Benchmark Report: Adobe Digital Index Q2 2014* (Oct. 20, 2014) at 3, available at http://www.cmo.com/content/dam/CMO_Other/ADI/Video_Benchmark_Q2_2014/video_benchmark_report-2014.pdf ("Online TV growth accelerates in 2014: 388% YOY growth for online TV video consumption.").

²⁰ Ooyala's Q4 2014 Global Video Index, <http://go.ooyala.com/rs/OOYALA/images/Ooyala-Global-Video-Index-Q4-2014.pdf>.

²¹ See Op-Ed, Megan Clarken, EVP, Neilson, "Nielsen Calls For Industry To Adopt New Ratings Standards," *Media Daily News* (Nov. 14, 2014), available at <http://www.mediapost.com/publications/article/238149/nielsen-calls-for-industry-to-adopt-new-ratings-st.html> (proposing new methods for audience measurement given that "more and more video content is being viewed outside of the [existing measurements] via different devices, including connected TV technologies like Apple TV or Roku boxes, gaming consoles and digital devices, PCs, tablets and smartphones").

²² Nielsen, "Devices proliferate, but viewing preferences depend on what and where we are watching." (April 14, 2014), available at <http://www.nielsen.com/us/en/insights/news/2015/devices-proliferate-but-viewing-preferences-depend-on-what-and-where-we-are-watching.html>.

Signatories were instrumental in promoting EPA’s adoption in 2014 of a new “thin client capability” definition in the ENERGY STAR Version 7.0 television specification for connected televisions that have implemented the RVU Alliance (www.rvualliance.org) and/or VidiPath (www.dlna.org) industry standards. Thin client capability allows connected televisions to replace set-top boxes in homes. This has the potential to benefit consumers, as typical thin client products in the market consumed 50 kWh/year, compared to 179.4 kWh/year for DVR products and 103.3 kWh/year for non-DVR products.

Impact on National Energy Consumption

In 2012, service providers began working with energy advocates to estimate the energy consumption of set-top boxes and the number of units installed in subscriber households. Using service provider and energy advocate reports and data on product trends, signatories developed two base case scenarios. These base cases are published in the Voluntary Agreement. The first base case, shown in Table 3, represents the market in 2012.

Table 3: Base Case – 2012 Estimated Energy Consumption

Segment	Category	UEC ^a	Units	TEC ^b	Power Plants
		kWh/yr	Millions	TWh/yr	Rosenfelds
Cable	DVR	282	27	7.5	2.5
	Non-DVR ^c	139	57	7.9	2.6
	Client ^d	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
U.S. Total		—	225	32	10.6

^a While the base case refers to the annual consumption of a single device as the Unit Energy Consumption (UEC), the ENERGY STAR Version 3.0 specification uses the term typical energy consumption (TEC) when referring to annual consumption of a single device. To remain consistent with the ENERGY STAR specifications, this report refers to the annual consumption of a single device as TEC.

^b While the base case refers to the aggregate annual consumption of deployed devices as TEC, the ENERGY STAR Version 3.0 specification uses TEC when referring to annual consumption of a single device. To prevent confusion, this report refers to the aggregate annual consumption of deployed devices as national energy consumption.

^c The originally published base case uses the term “receiver,” however, “non-DVR” is more accurate.

^d Thin clients were only available from cable service providers at the time the 2012 Base Case was being developed, but 2013 and 2014 procurement reports included thin clients from non-cable service providers as well.

The second base case, shown in Table 4, represents a scenario in which DVR growth continues to follow the growth trends leading up to the first base case. This scenario is meant to reflect the energy consumption of the market in 2023. The second base case is an estimate of national energy use if the energy efficiency commitments defined in the Voluntary Agreement are not implemented and DVR proliferation continues unabated following a linear growth pattern. In terms of annual energy consumption, the number of set-top boxes without DVR capability versus those with DVR capability deployed in households is significant; DVR set-top boxes consume more energy because they need non-volatile storage, such as a hard disk drive.

Table 4: Base Case – Estimated Energy Consumption – High-DVR Proliferation

Segment	Category	TEC	Units	National Energy Consumption	Power Plants
		kWh/yr	Millions	TWh/yr	Rosenfelds
Cable	DVR	282	57	16.1	5.4
	Non-DVR	139	27	3.7	1.2
	Client	90	2	0.1	0.0
	DTA	39	33	1.3	0.4
Satellite	DVR	283	71	20.1	6.7
	Non-DVR	110	21	2.3	0.8
Telco	DVR	140	21	2.9	1.0
	Non-DVR	90	6	0.5	0.2
U.S. Total		—	237	47	15.7

Each base case was developed based on historical data available at the time it was developed. The base cases may not be reflective of 2014 product procurement splits for various service provider types. Going forward, product mixes may continue to vary from the base case.

Comparison to First Base Case Scenario

To gauge the Voluntary Agreement’s impact on energy consumption at the national level, D+R estimated energy savings over the first base case. To do this, D+R used changes in video subscriber levels across the major segments (presented in Table 5) to estimate changes in set-top box stock levels.

Table 5: Percent Change in Subscriber Levels from 2012 to 2014

Segment	Percent Change 2012 to 2013 ^a	Percent Change 2013 to 2014 ^a
Cable	-4.5%	-0.3%
Satellite	1.0%	0.1%
Telco	25.4%	8.2%

^a Based on data provided by the Steering Committee (for 2012) and service providers (for 2013 and 2014).

By multiplying these percentages by the unit data presented in Table 3, D+R arrived at the total 2014 stock levels shown in Table 6. The 2013 unit estimates are included as a reference point.

Table 6: Estimates of Total Units in the Market in 2013 and 2014

Category	2013 Units ^a	2014 Units ^a
DVR	54,038,000	54,599,000
Non-DVR	130,343,000	122,650,000
Thin Client	10,561,000	20,299,000
DTA	31,632,000	31,543,000

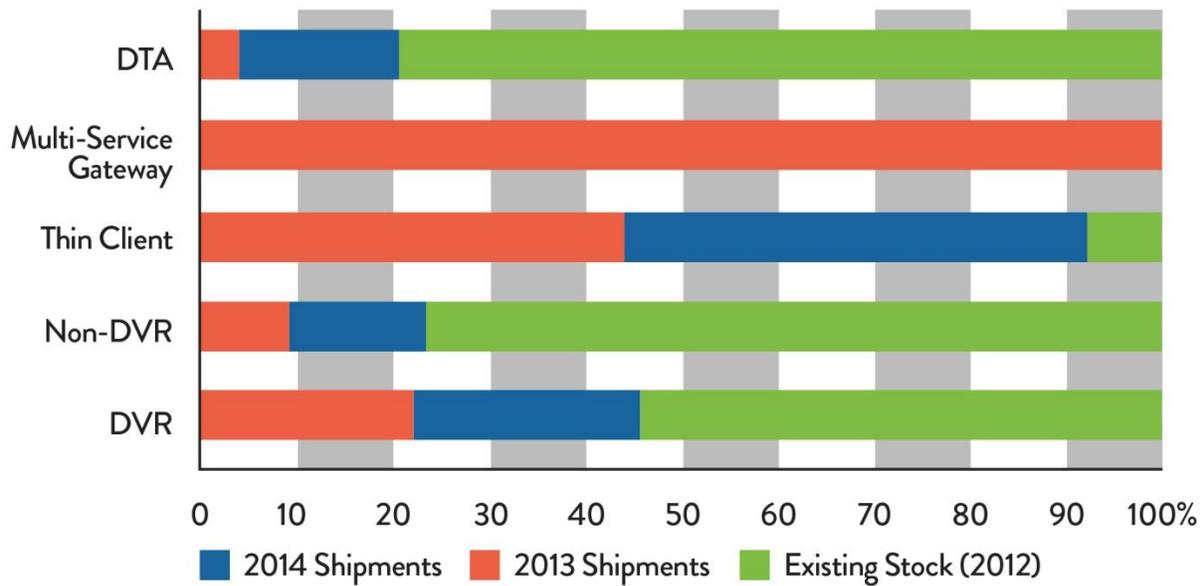
^a Units are rounded to the nearest thousand for this table, but D+R did not round any figures during the calculation and analysis process.

These figures are estimates. Under the terms of the Voluntary Agreement, D+R does not collect a census of deployed legacy equipment. Though the signatories purchased 11 million more set-top boxes in 2014 than in 2013, the model described below assumes that newly purchased devices replace existing devices, rather than increase the deployed stock. The service providers have explained that this reflects a relatively stable number of pay-TV subscribers, retirement of older (less energy-efficient) and broken equipment, replacement of older devices to satisfy consumer demand for new devices in a competitive marketplace, and loss of small units like DTAs, which are often not returned when consumers cancel service. The estimate produced by this model serves as a sound basis for reporting overall gains in national energy efficiency, but the signatories will continue to evaluate options for estimating overall stock for future annual reports.

The next step in estimating national energy consumption was to account for products procured in 2014. To arrive at the existing and new stock split, D+R subtracted 2014 set-top box procurements from the total units listed in Table 6. In general, D+R assumed that each new product replaced a product of the same type (i.e., new DVRs replaced existing DVRs). However, satellite thin clients, telco thin clients, and multi-service gateways were not included in the base case scenarios. Thin clients and DTAs do not offer DVR capabilities, so D+R assumed that these product types replaced non-DVRs. Multi-service gateway set-top boxes have greater capability than thin clients, so D+R assumed that these products replaced DVRs. While these assumptions do not account for households upgrading from a non-DVR to a DVR, D+R also made no assumptions about whole-home DVRs eliminating the need for additional DVRs.

Figure 1 presents the breakdown of new and existing stock for each set-top box category.

Figure 1: Existing Stock Versus New Procurements in 2014 (Percent of Units)



This yielded two sets of stock – new and existing – each with its own TEC values. The weighted average TECs for the existing and new stock are shown in Table 1.

Multiplying the number of units by the TEC produces the estimated national energy consumption shown in Table 7.

Table 7: National Energy Consumption for New and Existing Stock

Category	2012 Units		2012 TEC	New Stock (Units)	Weighted TEC Average Based on Procurement Data (kWh/yr)	National Energy Consumption (TWh/yr)
	Existing Stock in 2013	Existing Stock in 2014				
DVR	41,828,000	29,678,000	267	12,210,208	195.4	13.5
				12,710,777	179.4	12.6
Non-DVR	117,866,000	91,644,000	119	12,360,006	108.6	15.3
				18,646,064	103.3	14.2
Thin Client	1,566,000	1,566,000	90	8,994,794	51.0	0.6
				9,738,163	50.0	1.1
Multi-Service Gateway	0	-	N/A	232	219	0.0
				-	N/A	0.0
DTA	30,299,000	25,007,000	39	1,334,238	57.6	1.3
				5,201,332	49.3	1.3
U.S. Totals	191,559,000	147,895,000	-	34,899,478	-	30.6
				46,296,336	-	29.2

2013 2014

As Table 7 shows, the improvements in energy efficiency spurred by the Voluntary Agreement have had a large impact on national energy consumption. The Voluntary Agreement reduced national energy consumption from 32 TWh/year to in 2012 to 30.6 TWh in 2013 to 29.2 TWh/year in 2014, a reduction of 8.75%, despite an increase in the number of set-top boxes in the market. This 2.8 TWh reduction represents consumer savings of approximately \$336 million²³ and CO₂ emission savings of 1.9 million metric tons.²⁴ Over the first two years of the Voluntary Agreement, energy consumption is estimated to have been reduced by 4.2 TWh, saving consumers approximately \$504 million and avoiding 2.9 million metric tons of CO₂ emissions.²⁵

Comparison to Second Base Case Scenario

The first base case is a snapshot of the market at the end of 2012 and, as such, provides the basis for calculating energy consumption for 2013. The second base case reflects the projected energy consumption of the market in 2023 without the Voluntary Agreement and with unabated DVR proliferation. This provides two national energy consumption data points: 32 TWh/year for 2013 and 47 TWh/year for 2023. Because the second base case is based on a linear growth trend for DVR units and energy consumption, D+R calculated the annual incremental increase in national energy consumption by dividing the change in national energy consumption (47 TWh/year – 32 TWh/year = 15 TWh/year) by the number of years elapsed (2023 – 2013 = 10 years), yielding an increase of 1.5 TWh per year.

The 2014 procurement data submitted by service providers represents the stock at the end of 2014 and, therefore, the national energy consumption for 2015. To evaluate progress compared to the second base case, D+R calculated the national energy consumption for 2015 under the second base. To calculate 2015 national energy consumption, D+R added the incremental energy consumption increase (1.5 TWh per year) to the 2014 baseline national energy consumption (33.5 TWh/year),²⁶ arriving at 35 TWh/year. As noted in Table 7, the national energy consumption calculated for 2015 based on the 2014 procurement data is 29.2 TWh/year. This means the improved energy efficiency of the set-top boxes procured in 2014 will avoid 5.8 TWh in national energy consumption in 2015. This 16.6% reduction represents consumer savings of approximately \$696 million²⁷ and CO₂ emissions savings of 4.0 million metric tons.²⁸ The two-year estimated savings using this methodology is 8.7 TWh, which saved consumers approximately \$1.04 billion with a prevention of 6.0 million metric tons of CO₂ emissions.²⁹

These savings are more dramatic because the second base case represents a scenario that the Voluntary Agreement was developed to prevent. This scenario does not take into account the many changes that are expected to occur in the market between now and 2023, such as increased whole-home viewing.

²³ See *supra* note 6.

²⁴ See *supra* note 7.

²⁵ See D+R International, 2013 Annual Report, Voluntary Agreement for the Energy Efficiency of Set-Top Boxes (2013 Annual Report) at 14 (estimating 1.4 TWh reduction in energy usage).

²⁶ 2014 baseline national energy consumption calculated by adding 1.5 TWh to the 2013 baseline national energy consumption of 32 TWh.

²⁷ See *supra* note 6.

²⁸ See *supra* note 7.

²⁹ See 2013 Annual Report at 14-15 (estimating 2.9 TWh reduction in energy usage).

Conclusion

To achieve its objectives, the Voluntary Agreement establishes commitments for the pay television industry through 2017. In 2014, all of the cable signatories and two of the three telco signatories met their commitments with respect to light sleep. The satellite signatories committed to including APD in at least 90% of set-top boxes purchased after January 1, 2013; in 2014, 100% of the set-top boxes purchased by these signatories met this commitment. They also met their commitment to making whole-home systems available to all subscribers in 2013. Telco providers made similar commitments, which they met. All service providers met their commitment to provide reasonable access to energy efficiency information for set-top boxes purchased after January 1, 2014, and are signatories are working to improve the accessibility of this information.

Under the Voluntary Agreement, 90% of set-top boxes procured by participants after December 31, 2013 must meet the energy standards of ENERGY STAR Version 3.0, or Tier 1. All but one service provider met this commitment, with 95% of 2014 set-top boxes purchased meeting the ENERGY STAR Version 3.0 (Tier 1) standards. Voluntary Agreement participants demonstrated early adoption of Tier 2 performance levels, with an estimated 62.4% of set-top boxes purchased in 2013 achieving Tier 2 performance levels. One service provider audited in 2014 for its 2013 purchases was confirmed to be in compliance. Another service provider was audited in 2015 for its 2014 purchases and was also confirmed to be in compliance.

The signatories also reduced energy consumption through successful implementation of strategies to download light sleep capability to existing devices, including automatic power down feature in set-top boxes, and offering whole-home DVR functionality to reduce the number of energy-consuming hard drives in the home. They are working toward additional savings by field testing set-top boxes that include next-generation power management.

The first year of field verification was successful, with all 94 set-top boxes tested performing within the permissible range of the Tier 1 standards. The Voluntary Agreement reduced national energy consumption of set-top boxes from 32 TWh/year in 2013 to 29.2 TWh/year in 2014, a reduction of 8.75%, even as deployed stock is believed to have increased. This 2.8 TWh reduction represents consumer savings of approximately \$336 million and CO₂ emissions savings of 1.9 million metric tons. Over the first two years of the Voluntary Agreement, energy consumption is estimated to have been reduced by 4.2 TWh, saving consumers approximately \$504 million and avoiding 2.9 million metric tons of CO₂ emissions. These energy savings are even larger when compared to projections based on unabated proliferation of DVRs as may have occurred in the absence of the Voluntary Agreement. Against those projections, the improved energy efficiency of the set-top boxes procured in 2014 will result in reduced national energy consumption in 2015 from 35 TWh/year to 29.2 TWh/year, avoiding 5.8 TWh in national energy consumption. This 16.6% reduction represents consumer savings of approximately \$696 million and CO₂ emissions savings of 4.0 million metric tons. The two-year estimated savings using this methodology is 8.7 TWh, which saved consumers approximately \$1.04 billion with a prevention of 6.0 million metric tons of CO₂ emissions.

Appendix A: Voluntary Agreement Commitments

Table 8 lists the commitments of the various signatories to the Voluntary Agreement along with the status of the signatories' progress toward that commitment.

Table 8: Voluntary Agreement Commitments

Commitments	Group	Status
90% procurement of set-top boxes meeting Tier 1 (ENERGY STAR Version 3.0) after December 31, 2013 (for calendar years 2014, 2015, and 2016).	All Service Providers	95% procurement after December 31, 2013. Only one signatory did not meet the commitment in 2014.
Prepare a confidential annual procurement report for the prior year by April 1 of the following year beginning in 2014.	All Service Providers	100% filed on time with Independent Administrator in 2014.
Provide energy efficiency information to subscribers and potential subscribers no later than January 1, 2014.	All Service Providers	Complete. Energy efficiency information provided by all service providers on time.
Enable light sleep capabilities in certain new models deployed after January 1, 2013, with a default inactivity period of 4 hours where doing so does not degrade customer experience.	Telco (Verizon)	A 2013 regional trial of an APD to light sleep mode resulted in significant customer dissatisfaction such that the mode was disabled; Verizon is still working on delivering set-top boxes with energy efficient modes that do not substantially degrade the customer experience.
Offer and deploy whole-home servers and clients as appropriate.	Telco (Verizon)	Complete. Verizon launched FiOS Quantum whole-home DVR in April 2014.

Commitments	Group	Status
90% procurement of set-top boxes with automatic power down feature in 2013.	Satellite	Complete. 100% deployment in 2014.
Make whole-home servers and clients available to all new and existing subscribers in 2013	Satellite	Complete. Offered throughout the United States in 2013 and 2014.
90% procurement of set-top boxes meeting Tier 2 after December 31, 2016 (for calendar year 2017).	All Service Providers	62.4% procurement rate of set-top boxes indicating performance at Tier 2 levels after December 31, 2013.
Review the energy use of set-top boxes that incorporate DOCSIS 3.0 8x4 mode and greater by October 2015 and to modify the Additional Functionality TEC Allowance as appropriate.	All Signatories	Not yet due.
Work with suppliers to develop set-top boxes with next-generation power management, begin field testing of these set-top boxes by December 31, 2014, and begin deploying them in later years under conditions set forth in the Voluntary Agreement.	Cable	Field tests began in December 2014.
Use reasonable efforts to design and manufacture equipment to enable improved set-top box energy efficiency while meeting the service providers' functional and operational specification.	Equipment Manufacturers	Manufacturers' efforts to date are reflected in the energy savings reported by service providers, and there is ongoing development of next-generation set-top boxes with lower-power silicon solutions.
Pursue reasonable strategies to reduce energy consumption.	Telco (Verizon)	Ongoing. For example, Verizon deployments have transitioned to the FiOS Quantum platform, which has implemented new capabilities (e.g., a dormant/off mode for selected components) that reduce energy consumption without compromising the customer experience.
Continue to deploy set-top boxes with light sleep capabilities.	Telco (IPTV)	Continued deployment in 2014.
Deploy whole-home DVR set-top boxes where possible.	Telco (IPTV)	Deployed throughout the United States in 2014.
Evaluate options for further reducing inactive-state energy consumption.	Telco (IPTV)	CenturyLink has sought vendor input on energy-saving capabilities as it selects next-generation set-top boxes. AT&T continues to evaluate many options for improving energy efficiency.
Provide periodic updates to government and energy-advocate stakeholders.	Telco (IPTV)	Through the Steering Committee's outreach and the publication of the Annual Report, updates were provided to DOE, state regulators, and energy-advocate stakeholders.
Continue the deployment, which began in September 2012, of new set-top boxes with light sleep capabilities and software updates enabling light sleep to certain models of deployed DVRs.	Cable	Continued deployment and software updates in 2014. More than 21 million set-top boxes deployed or upgraded.

Appendix B: Set-Top Boxes Purchased by Voluntary Agreement Signatories in 2014

Table 9 lists the set-top boxes purchased by Voluntary Agreement signatories in 2014. Please note that the same model could have variances in TEC for several reasons, including differences in reported versus calculated TEC (see note a), enabling of different product features, and/or deployment of the device by service providers running different software. ENERGY STAR Version 3.0 (Tier 1) calculates maximum allowable 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 9 in the “Claimed Allowances” column. ENERGY STAR Version 3.0 has rules for how to claim feature allowances, so the column for claimed allowances lists only the features used when calculating the maximum allowable TEC for the specific product.

The Excel template used to collect product data used algorithms to calculate maximum allowable TEC according to the ENERGY STAR Version 3.0 rules and the service provider reported features before assessing whether a product met ENERGY STAR Version 3.0 (Tier 1). Service providers had the opportunity to review Table 9 multiple times to ensure that the data presented here is accurate. Procurement data submitted by service providers is subject to one random audit per year and the Steering Committee has the option to direct the Independent Administrator to conduct additional audits as necessary. Set-top boxes are subject to field verification of energy performance data. An asterisk has been added to those units that have been evaluated through field verification in 2014.

Table 9: Set-Top Boxes Procured by Voluntary Agreement Signatories in 2014

Service Provider	Base Type	Primary Function	Brand	Model No.	Claimed Allowances	Modal Characteristics (W)		TEC _a (kWh/yr)	Meets ENERGY STAR Version 3.0 (Tier 1)
						On	Sleep		
AT&T	IP	DVR	Arris	2250*	AVP, DVR, HD, MR, MS-T/I	17.7	14.4	142.8	Yes
AT&T	IP	DVR	Arris	2410	AVP, DVR, HD, MR, MS-T/I	17.3	16.4	148.0	Yes
AT&T	IP	DVR	Cisco	7500	AVP, DVR, HD, MR, MS-T/I	18.0	14.6	145.3	Yes
AT&T	IP	DVR	Pace	8005	AVP, DVR, HD, MR, MS-T/I	11.3	8.2	87.7	Yes
AT&T	IP	DVR	Pace	8010	AVP, DVR, HD, MR, MS-T/I	11.0	8.0	85.4	Yes
AT&T	IP	Non-DVR	Arris	1200	AVP, HD, HNI, MS-T/I	10.9	10.5	94.0	Yes
AT&T	IP	Non-DVR	Arris	2200	AVP, HD, HNI, MS-T/I	11.3	11.2	98.2	Yes
AT&T	IP	Non-DVR	Arris	2500	AVP, HD, HNI, MS-T/I	11.7	11.4	101.6	Yes
AT&T	IP	Non-DVR	Cisco	7005*	AVP, HD, HNI, MS-T/I	11.6	11.4	100.9	Yes
AT&T	IP	Non-DVR	Cisco	7105	AVP, HD, HNI, MS-T/I	11.8	11.8	103.4	Yes
Bright House Networks	CBL	DVR	Motorola	DCX3510	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	22.8	18.3	175.0	Yes
Bright House Networks	CBL	DVR	Cisco	8742HDC	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	21.7	18.4	175.0	Yes
Bright House Networks	CBL	DVR	Samsung	SMT-H3272	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	30.3	25.8	240.0	No
Bright House Networks	CBL	DVR	Motorola	DCX3600	APD, AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	25.5	23.9	215.0	Yes
Bright House Networks	CBL	DVR	Samsung	SMT-H4372	APD, AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S	27.0	24.0	220.0	Yes
Bright House Networks	CBL	Non-DVR	Motorola	DCX3200 p3	APD, AVP, CC, DOCSIS, HD, HNI	14.3	11.7	115.0	Yes
Bright House Networks	CBL	Non-DVR	Cisco	4742HDC	APD, AVP, CC, DOCSIS, HD, HNI	18.8	14.1	140.0	Yes
Bright House Networks	CBL	Non-DVR	Samsung	SMT-H3362	APD, AVP, CC, DOCSIS, HD, HNI	14.7	13.3	125.0	Yes
Bright House Networks	DTA	Cable DTA	Cisco	DTA 170HD	HD	5.1	5.1	48.0	Yes

Service Provider	Base Type	Primary Function	Brand	Model No.	Claimed Allowances	Modal Characteristics (W)		TEC _a (kWh/yr)	Meets ENERGY STAR Version 3.0 (Tier 1)
						On	Sleep		
Bright House Networks	DTA	Cable DTA	Technicolor	DCI401TWC	HD	6.5	6.5	60.0	Yes
Cablevision	CBL	DVR	Samsung	5320*	AVP, DOCSIS, HD, nDVR	18.2	17.2	156.0	Yes
CenturyLink	IP	DVR	ARRIS	1232*	AVP, DVR, HD, HNI, MR, MS-T/I	16.2	12.6	126.9	Yes
CenturyLink	IP	DVR	ARRIS	2262	AVP, DVR, HD, HNI, MR, MS-T/I	11.8	10.5	99.1	Yes
CenturyLink	IP	Non-DVR	ARRIS	2502	AVP, HD, HNI, MS-T/I	11.8	11.7	102.7	Yes
CenturyLink	IP	Non-DVR	Cisco	7005	AVP, HD, HNI, MS-T/I	11.6	11.4	100.9	Yes
CenturyLink	IP	DVR	Pace	8005*	AVP, DVR, HD, HNI, MR, MS-T/I	11.3	8.2	87.5	Yes
Charter	DTA	Cable DTA	Cisco	DTA170HD*	HD	4.9	4.8	45.0	Yes
Charter	DTA	Cable DTA	Pace	DTADC60XuHD	HD	6.4	6.4	58.0	Yes
Charter	CBL	Non-DVR	Pace	RNG110RHD	AVP, CC, DOCSIS, HD	12.5	11.6	110.0	Yes
Charter	CBL	Non-DVR	Motorola	DCX3220MHD	AVP, DOCSIS, HD	11.1	10.8	100.0	Yes
Charter	CBL	Non-DVR	Motorola	DCX3200M-HD-P3	AVP, CC, DOCSIS, HD	12.4	12.1	110.0	Yes
Charter	CBL	Non-DVR	Cisco	EXP4640HDC*	AVP, CC, DOCSIS, HD	14.0	13.5	125.0	Yes
Charter	CBL	Non-DVR	Cisco	EXP4640HDC2	AVP, CC, DOCSIS, HD	12.6	8.7	100.0	Yes
Charter	CBL	Non-DVR	Pace	DC550DR	AVP, DOCSIS, HD	11.2	10.3	99.0	Yes
Charter	CBL	DVR	Pace	RNG200RHD	AVP, CC, DVR, DOCSIS, HD, MS-C/S	16.5	15.6	148.0	Yes
Charter	CBL	DVR	Cisco	EXP8640HD-DVR*	APD, AVP, CC, DVR, DOCSIS, HD, MS-C/S	23.2	18.2	180.0	Yes
Charter	CBL	DVR	Cisco	EXP8640H-DC2-DVR	APD, AVP, CC, DVR, DOCSIS, HD, MS-C/S	20.2	13.7	140.0	Yes
Charter	CBL	DVR	Cisco	EX-P8650HD-DVR	APD, AVP, CC, DVR, DOCSIS, HD, MS-C/S	26.9	19.1	190.0	Yes
Charter	CBL	DVR	Motorola	3510MHD-DVR	AVP, CC, DVR, DOCSIS, HD, MS-C/S	22.8	21.1	193.0	No
Charter	CBL	DVR	Motorola	3520MHD-DVR	AVP, DVR, DOCSIS, HD, MS-C/S	22.9	22.1	198.0	No
Charter	CBL	DVR	Pace	TDC788D	AVP, DVR, DOCSIS, HD, MS-C/S	16.1	15.1	140.0	Yes

Service Provider	Base Type	Primary Function	Brand	Model No.	Claimed Allowances	Modal Characteristics (W)		TEC _a (kWh/yr)	Meets ENERGY STAR Version 3.0 (Tier 1)
						On	Sleep		
Comcast	DTA	Cable DTA	Pace	DC 60XU	HD	6.8	6.8	60.0	Yes
Comcast	DTA	Cable DTA	Technicolor	DCI401Com3	HD	6.7	6.7	60.0	Yes
Comcast	DTA	Cable DTA	Motorola	HD-DTA100u	HD	3.9	3.9	35.0	Yes
Comcast	CBL	DVR	Motorola	DCX3501/E385/012/500	AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	23.4	22.2	205.0	Yes
Comcast	CBL	Non-DVR	Motorola	DCX3200M P3 (MR150CNM)	AVP, CC, DOCSIS, HD, HNI	13.8	13.6	125.0	Yes
Comcast	CBL	DVR	Arris	MX011ANM	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	27.1	25.2	240.0	Yes
Comcast	CBL	DVR	Pace	PX001ANM*	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	31.5	25.7	265.0	Yes
Comcast	CBL	DVR	Pace	PX013ANM	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	22.5	21.3	200.0	Yes
Comcast	CBL	Non-DVR	Pace	PR150BNM*	AVP, CC, DOCSIS, HD, HNI	12.6	11.6	110.0	Yes
Comcast	CBL	Non-DVR	Pace	PR150BNM	AVP, CC, DOCSIS, HD, HNI	12.1	11.4	108.0	Yes
Comcast	CBL	Non-DVR	Samsung	SR150BNM	AVP, CC, DOCSIS, HD, HNI	14.8	13.4	130.0	Yes
Comcast	IP	Non-DVR	Pace	PX032ANI	AVP, HD, HNI	5.3	4.9	47.0	Yes
Comcast	CBL	Non-DVR	Cisco	RNG150N	AVP, CC, DOCSIS, HD, HNI	14.4	12.7	125.0	Yes
Comcast	CBL	DVR	Cisco	RNG200N*	AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	25.5	21.2	210.0	Yes
Comcast	CBL	DVR	Pace	PX001ANC*	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	32.5	26.3	270.0	Yes
Comcast	CBL	DVR	Pace	PX013ANC	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	23.5	22.5	205.0	Yes
Comcast	CBL	DVR	Arris	MX011ANC	AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	27.2	25.4	235.0	Yes
Comcast	CBL	Non-DVR	Pace	PR150BNC*	AVP, CC, DOCSIS, HD, HNI	13.5	12.5	120.0	Yes
Comcast	CBL	Non-DVR	Samsung	SR150BNC	AVP, CC, DOCSIS, HD, HNI	15.6	14.0	135.0	Yes
Comcast	IP	Non-DVR	Pace	PX032ANI	AVP, HD, HNI	5.8	5.0	50.0	Yes
Cox	DTA	Cable DTA	Evolution	DMS2344UHDS	HD	6.8	6.8	60.0	Yes

Service Provider	Base Type	Primary Function	Brand	Model No.	Claimed Allowances	Modal Characteristics (W)		TECa (kWh/yr)	Meets ENERGY STAR Version 3.0 (Tier 1)
						On	Sleep		
Cox	CBL	Non-DVR	Cisco	4742HDC	APD, AVP, CC, DOCSIS, HD, HNI	18.6	14.1	135.0	Yes
Cox	CBL	DVR	Cisco	8742HDC*	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	22.6	18.7	175.0	Yes
Cox	CBL	DVR	Cisco	9865HDC*	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	28.0	25.3	229.0	Yes
DIRECTV	SAT	Non-DVR	DIRECTV	H25-100	APD, AVP, HD, HNI	10.3	8.4	78.6	Yes
DIRECTV	SAT	DVR	DIRECTV	HR44-200	APD, AVP, DVR, HD, HNI, MR, MS-C/S	19.3	18.0	161.2	Yes
DIRECTV	SAT	DVR	DIRECTV	HR44-500*	APD, AVP, DVR, HD, HNI, MR, MS-C/S	18.9	17.9	159.3	Yes
DIRECTV	SAT	DVR	DIRECTV	HR44-700	APD, AVP, DVR, HD, HNI, MR, MS-C/S	18.5	17.4	155.3	Yes
DIRECTV	TC	Thin Client	DIRECTV	C41-100*	APD, AVP, HD, HNI	5.6	4.2	40.0	Yes
DIRECTV	TC	Thin Client	DIRECTV	C41-500*	APD, AVP, HD, HNI	5.6	4.0	39.4	Yes
DIRECTV	TC	Thin Client	DIRECTV	C41-700*	APD, AVP, HD, HNI	5.2	3.7	36.0	Yes
DIRECTV	TC	Thin Client	DIRECTV	C41W-100*	APD, AVP, HD, HNI	7.2	5.6	53.0	Yes
DIRECTV	TC	Thin Client	DIRECTV	C41W-500*	APD, AVP, HD, HNI	7.2	5.7	53.9	Yes
DIRECTV	TC	Thin Client	DIRECTV	C51-100	APD, AVP, HD, HNI	6.4	3.7	39.4	Yes
DISH	SAT	Non-DVR	DISH	Solo ViP211z*	APD, AVP, HD	7.4	7.0	62.0	Yes
DISH	TC	Thin Client	DISH	HWID = ZAxx	APD, AVP, HD, HNI	9.0	8.6	76.0	Yes
DISH	TC	Thin Client	DISH	HWID = ZBxx	APD, AVP, HD, HNI	6.9	6.8	60.0	Yes
DISH	SAT	DVR	DISH	HWID = NDxx	APD, AVP, DVR, HD, MR, MS-C/S, XCD	28.2	27.3	242.0	No
DISH	SAT	DVR	DISH	HWID = NExx*	APD, AVP, DVR, HD, MR, MS-C/S, XCD	22.0	21.5	190.0	Yes
DISH	TC	Thin Client	DISH	Wireless Joey*	APD, AVP, HD, HNI, MIMO-2.4	7.8	7.5	65.0	Yes
DISH	SAT	Non-DVR	DISH	Super Joey*	APD, AVP, HD, HNI, MS-C/S	12.0	12.0	106.0	Yes
Time Warner Cable	CBL	DVR	Motorola	DCX3510*	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	22.8	18.3	175.0	Yes
Time Warner Cable	CBL	DVR	Cisco	8742HDC*	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	21.7	18.4	175.0	Yes

Service Provider	Base Type	Primary Function	Brand	Model No.	Claimed Allowances	Modal Characteristics (W)		TEC ^a (kWh/yr)	Meets ENERGY STAR Version 3.0 (Tier 1)
						On	Sleep		
Time Warner Cable	CBL	DVR	Samsung	SMT-H3272*	APD, AVP, CC, DVR, DOCSIS, HD, MR, MS-C/S	30.3	25.8	240.0	No
Time Warner Cable	CBL	DVR	Motorola	DCX3600	APD, AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	25.5	23.9	215.0	Yes
Time Warner Cable	CBL	DVR	Cisco	9865HDC	APD, AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	26.7	22.4	210.0	Yes
Time Warner Cable	CBL	DVR	Samsung	SMT-H4372	APD, AVP, CC, DVR, DOCSIS 3.0, HD, MR, MS-C/S, XCD	27.0	24.0	220.0	Yes
Time Warner Cable	CBL	Non-DVR	Motorola	DCX3200 p3	APD, AVP, CC, DOCSIS, HD, HNI	14.3	11.7	115.0	Yes
Time Warner Cable	CBL	Non-DVR	Cisco	4742HDC	APD, AVP, CC, DOCSIS, HD, HNI	18.8	14.1	140.0	Yes
Time Warner Cable	CBL	Non-DVR	Samsung	SMT-H3362	APD, AVP, CC, DOCSIS, HD, HNI	14.7	13.3	125.0	Yes
Time Warner Cable	DTA	Cable DTA	Cisco	DTA 170HD	HD	5.1	5.1	48.0	Yes
Time Warner Cable	DTA	Cable DTA	Motorola	HD-DTA100u	HD	3.7	3.7	35.0	Yes
Time Warner Cable	DTA	Cable DTA	Technicolor	DCI401TWC	HD	6.5	6.5	60.0	Yes
Verizon	CBL	DVR	Arris	1100	AVP, CC, DVR, HD, MR, MS-C/S	25.0	25.0	219.0	No
Verizon	IP	Thin Client	Arris	1100 P1	AVP, HD, HNI	8.7	8.7	76.2	Yes
Verizon	IP	Thin Client	Arris	1100 P2	AVP, HD, HNI	8.7	8.7	76.2	Yes
Verizon	CBL	DVR	Arris	7232 P2*	AVP, CC, DVR, HD, MR, MS-C/S	22.7	22.7	198.9	Yes
Verizon	CBL	Non-DVR	Arris	7100 P2	AVP, CC, HD, HNI	15.6	15.6	136.7	No
Verizon	CBL	DVR	Cisco	435 P2*	AVP, CC, DVR, HD, MR, MS-C/S	22.5	22.5	197.4	Yes
Verizon	CBL	Non-DVR	Cisco	335 P2*	AVP, CC, HD, HNI	16.2	16.2	141.9	No

^a These values are reported TEC, rather than calculated TEC (called “measured TEC” in the ENERGY STAR Version 3.0 specification). Under the ENERGY STAR Version 3.0 specification, service providers have the option to round up calculated TEC values for reporting purposes to account for production variances. These values are referred to as reported TEC.

Table 10 presents the base allowances for set-top boxes under ENERGY STAR Version 3.0 (Tier 1).

Table 10: Set-Top Box Allowance

Base Type (Use topmost if multiple apply)	Tier 1 Allowance (kWh/yr)
Cable DTA (DTA)	35
Cable (CBL)	60
Satellite (SAT)	70
Internet Protocol (IP)	50
Thin Client (TC)	35

Table 11 defines the features listed for set-top boxes and outlines the feature allowances under ENERGY STAR Version 3.0 (Tier 1).

Table 11: Set-Top Box Feature Allowances

Feature	Description	ENERGY STAR Version 3.0 (Tier 1) TEC Allowance (kWh/yr)
AVP	Advanced video processing (AVP) enables set-top box to encode, decode, and/or transcode audio/video signals	12
CC	CableCARD™ gives set-top boxes the capacity to decrypt premium audio/video content and services as well as other network control functions	15
DVR	A digital video recorder (DVR) allows set-top boxes to store digital video files to a rewritable disk or other integrated storage device	45
DOCSIS	Data Over Cable Service Interface Specifications (DOCSIS) enable set-top boxes to distribute data and audio/video content over cable infrastructure	20
HD	High definition (HD) makes set-top boxes capable of transmitting video signals with resolution greater than or equal to 720p	25
HNI	Home network interfaces (HNIs) allow set-top boxes to interface with external devices via a high-bandwidth local area network	10 (base)
MR	Multi-room (MR) functionality enables set-top boxes to provide independent audio/video content to multiple devices within a single household	40
MS-C/S	Multi-stream (MS) for cable and satellite (C/S) is the capability to deliver multiple simultaneous audio/video streams to a single display, thin-client/remote set-top box, or recording device over coax or via satellite	16
MS-T/I	Multi-stream (MS) for terrestrial and Internet protocol (T/I) delivers multiple simultaneous audio/video streams through a LAN or Internet protocol home network	8

Feature	Description	ENERGY STAR Version 3.0 (Tier 1) TEC Allowance (kWh/yr)
RMP	Removable media player (RMP) gives a set-top box the ability to decode digitized audio/video signals on DVD or Blu-ray discs	8
RMR	Removable media player/recorder (RMR) gives a set-top box the ability to decode and record digitized audio/video signals on DVD or Blu-ray discs	10
Proposed for Tier 2, but allowed in 2014		
DOCSIS 3.0	Data Over Cable Service Interface Specifications (DOCSIS) enable set-top boxes to distribute data and audio/video content over cable infrastructure and introduces support of Internet Protocol Version 6 (IPv6)	11
MIMO-2.4	Multi-Input Multi-Output (MIMO) Wireless HNI that supports more than one 2.4 GHz spatial stream to both send receive information	2 (per spacial stream)
XCD	Enables STB to change format of video content for playback on additional devices	13

Appendix C: Consumer Set-Top Box Energy Efficiency Information

Service Provider	Consumer Information Location	Additional Information
AT&T	http://www.att.com/shop/tv.html	Click the “Equipment & Installation” tab, then click “Receiver Energy Efficiency Information”
Bright House Networks	http://support.brighthouse.com/Article/Converter-Energy-7843/	Redirect to http://energy.cablelabs.com/bright-house-networks/
Cablevision (Optimum)	http://optimum.custhelp.com/app/answers/detail/a_id/2809/kw/energy%20star	Redirect to http://energy.cablelabs.com/cablevision
CenturyLink	http://promotions.centurylink.com/prism/existing/	
Charter Communications	http://charter.com/drenergy	Redirect to http://energy.cablelabs.com/charter/
Comcast	http://corporate.comcast.com/news-information/news-feed/a-commitment-to-creating-the-sustainable-devices-of-tomorrow	Redirect to http://energy.cablelabs.com/comcast
Cox Communications	http://www.cox.com/myconnection/community/conserve.cox http://www.cox.com/aboutus/our-story/in-the-community/conserve.cox	Redirect to http://energy.cablelabs.com/comcast
DIRECTV	http://www.directv.com/technology/hd_dvr_receiver?ACM=false	Go to “Features,” then “More Info” Redirect to http://www.energystar.gov/productfinder/product/certified-set-top-boxes/
DISH Network	http://www.mydish.com/support/energy-efficiency	
Time Warner	http://www.timewarnercable.com/en/our-company/corporate-responsibility/environment.html	Scroll down to “CableLabs: TWC’s Set-Top Box energy information,” redirect to http://energy.cablelabs.com/time-warner-cable
Verizon	http://www.verizon.com/support/residential/tv/fios/tv/receivers/user+guides/user+guides.htm	Scroll down to “Verizon STB Energy Information”

Appendix D-1: 2013 Procurement Audit Report



2013 Annual Report Audit Results

In 2012, the pay television industry signed a voluntary agreement with the goal of increasing the energy efficiency of set-top boxes, while protecting rapid innovation and timely introduction of new features. The agreement was amended in 2013 to include energy-efficiency advocates. Signatories of the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes now include 11 cable, satellite, and telco video service providers, four major set-top box manufacturers, energy-efficiency advocates, and other organizations.

The Voluntary Agreement requires the service providers to submit annual procurement data to an independent administrator, who collects and analyzes the data, then publishes the findings in an Annual Report. Data from the individual service providers is 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.

D&R International conducted an audit of the procurement data provided in 2014, which was used to develop the findings published in the 2013 Annual Report (released August 15, 2014). D&R randomly selected the service provider by creating an Excel spreadsheet and using the “random” function. (The Voluntary Agreement stipulates that the service provider audited in 2014 will be eliminated from consideration for next year’s random audit.)

D&R requested raw data from the selected service provider to verify the procurement data submitted. Over the course of nearly three months, D&R worked with the service provider to collect additional information and review the submitted data, which included invoice data, purchase order data, product specification sheets, and screenshots from the service provider’s purchase order system.

D&R, as Independent Administrator, has determined that the service provider selected for the audit is in substantial compliance with the Voluntary Agreement. After cross-checking these datasets and comparing them to the originally provided procurement data, D&R concluded that the percentage of set-top boxes procured by the service provider in 2013 meeting ENERGY STAR Version 3.0 (Tier 1) is above the 90% threshold established by the Voluntary Agreement.

December 11, 2014



2014 Annual Report Audit Results

In 2012, the pay television industry signed a voluntary agreement with the goal of increasing the energy efficiency of set-top boxes, while protecting rapid innovation and timely introduction of new features. Signatories of the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes include 11 cable, satellite, and telco service providers, four major set-top box manufacturers, energy-efficiency advocates, and other organizations.

The Voluntary Agreement requires the service providers to submit annual procurement data to an independent administrator, who collects and analyzes the data, then publishes the findings in an Annual Report. Data from the individual service providers is 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.

For this second annual procurement audit, D+R International randomly selected a service provider by creating an Excel spreadsheet that excluded the service provider audited in 2014 and using the "random" function.

D+R requested raw data from the selected service provider to verify the 2014 procurement data submitted in 2015. D+R worked with the service provider to collect additional information and reviewed the submitted data, which included invoice data, test reports, and specification sheets.

D+R, as Independent Administrator, has determined that the service provider selected for the audit is in substantial compliance with the Voluntary Agreement. After cross-checking these datasets and comparing them to the procurement data originally provided, D+R concluded that the percentage of set-top boxes procured by the service provider in 2014 meeting ENERGY STAR Version 3.0 (Tier 1) is above the 90% threshold established by the Voluntary Agreement.

July 10, 2015

