

2017 Annual Report

Canadian Energy Efficiency Voluntary Agreement for Set-Top Boxes

D+R
International

Prepared on behalf of the
Steering Committee by:
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EXECUTIVE SUMMARY

In 2017, as a result of discussions encouraged by Natural Resources Canada (NRCan), five of the largest Canadian Pay TV service providers and three leading set-top box manufacturers signed the Canadian Energy Efficiency Voluntary Agreement for Set-Top Boxes (CEEVA or “the Agreement”).¹ CEEVA is modeled in part after the successful implementation of a similar agreement in the United States, known as the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes.² The primary objective of CEEVA is to improve the energy efficiency of set-top boxes while promoting innovation and introduction of new features without compromising the customer experience.

As part of CEEVA, a report is published annually which summarizes the accomplishments and developments achieved by the Agreement during the previous calendar year. This report for 2017, published by the appointed independent Data Aggregator, D+R International, Ltd. (“D+R”), is the first report published under CEEVA.

CEEVA requires that at least 90% of all new set-top boxes received by the service provider signatories after January 1, 2017 meet the Tier 1 efficiency levels established in the ENERGY STAR® V3.0 Program Requirements. D+R found that this commitment was met, with 100% of all new set-top boxes meeting the Tier 1 efficiency levels in 2017.³ Beginning January 1, 2018, the service provider signatories committed that 90% of their purchases of new set-top boxes will meet more rigorous Tier 2 efficiency levels as defined in Annex B of CEEVA. D+R found that the signatories are on track to meet this commitment, with 86.4% of new set-top boxes meeting Tier 2 efficiency levels a year early in 2017.

In addition to meeting the efficiency targets set forth in CEEVA, the signatories also conduct certified testing of all reported devices, provide public access to information about the energy consumption characteristics of reported devices, and participate in an annual random audit of procurement figures to verify reports, all while continuing to monitor the effectiveness of CEEVA year over year.

1 - Canadian Pay TV Set-Top Box Energy Efficiency Voluntary Agreement available at <http://www.energyefficiency-ca.ca/wp-content/uploads/2017/09/CEEVA-as-Amended-9-6-17-Final.pdf>.

2 - Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes available at <https://www.energy-efficiency.us/library/pdf/Set-top-Box-Voluntary-Agreement-2018-2.pdf>.

3 - This conclusion is based on 2017 procurement data provided by service provider signatories to D+R and the results of the verification testing and audit described herein.

OVERVIEW OF CEEVA

Canadian Pay TV providers deliver television service to approximately 11 million households using a variety of specialized devices referred to as set-top boxes.⁴ These devices allow homes to receive encrypted television programming and related services from providers, and support a variety of services such as program guides, Personal Video Recorders (PVR), and multi-room viewing, all which help to deliver reliable viewing and enhance the customer experience. Set-top boxes vary widely among service providers, and include both hardware components and software programming, all of which are frequently updated to deliver the newest services and technologies to customers.

All set-top boxes require power to operate. To help reduce the energy consumed by these devices, five of the largest Pay TV service providers along with manufacturers of set-top boxes and other supporting organizations are participating in CEEVA. CEEVA is modeled after the U.S. Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes.⁵

The set-top box types received by the signatories in 2017 are classified into two categories:

- **Personal Video Recorder (PVR):** Set-top boxes with features that enable recording and playback of video content from a hard disk drive or other integrated storage.⁶
- **Non-PVR:** Set-top boxes that do not include features that enable recording and playback of video content.

CEEVA Objectives

The overall objective of CEEVA is to encourage deployment of energy-efficient set-top boxes while allowing for innovation and advances in rapidly-changing technologies, and without adversely impacting the customer experience. By encouraging the deployment of energy-efficient set-top boxes, CEEVA aims to improve Canada's environment and reduce carbon footprint in a manner that does not disrupt the Pay TV industry's high-quality services or stifle innovation.

Signatories and Steering Committee

The current signatories and participants in CEEVA are listed below. Each signatory and non-signatory member listed has representation on the Steering Committee.

Service Provider Signatories

- Bell Canada
- Cogeco
- Rogers Communications
- Shaw Communications
- Videotron

Manufacturer Signatories

- ARRIS
- Echostar Technologies
- Technicolor

4 - Canadian Radio-television and Telecommunications Commission, "2017 Communication Monitoring Report" available at <https://crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2017/cmr2017.pdf>.

5 - See *supra* n. 2.

6 - PVRs are referred to as Digital Video Recorders (DVR) in CEEVA.

Non-Signatory Members of the Steering Committee

- Natural Resources Canada (NRCan)
- CableLabs
- Consumer Technology Association (CTA)

The Steering Committee is established as the coordinating and governing body of CEEVA, and to ensure that the goals of CEEVA are met, including:

- Ensuring a made in Canada agreement, standards, and Steering Committee that, at the same time, takes into account the North American marketplace for set-top boxes,
- Creating a simplified, transparent, and accountable process,
- Supporting a consensus approach to decision making, with the need for “votes” to be used in very limited circumstances; and
- Supporting innovation and avoiding disruption of the Canadian market or Canadian consumers.

Additionally, the Steering Committee selects the Data Aggregator responsible for aggregating reporting data from each signatory and publishing the annual report. In 2017, the Steering Committee selected D+R as the Data Aggregator.

Service Provider Commitments

The primary commitment of CEEVA is to procure energy-efficient set-top boxes. Specifically, the service providers committed that 90% of the new set-top boxes they received in 2017 would meet CEEVA's Tier 1 energy efficiency levels. Beginning January 1, 2018, more rigorous Tier 2 energy efficiency levels became applicable to this commitment. To further support these commitments, service providers committed to provide information to consumers about the general energy consumption characteristics of set-top boxes, as well as continue to monitor the effectiveness of CEEVA by reviewing its terms annually.

Data Aggregator Role

The Data Aggregator is a third party organization selected by the Steering Committee. Pursuant to CEEVA, the Data Aggregator must aggregate and analyze confidential procurement data submitted by the signatories to determine compliance with CEEVA commitments described herein. Additionally, this role includes verifying the test results of each set-top box reported by service providers. If any of the commitments are not met, the Data Aggregator initiates a remedial process following the procedures set forth in CEEVA.

In addition to aggregating and analyzing the annual data submissions from each signatory, the Data Aggregator is also tasked with auditing one randomly-selected service provider's procurement figures each year. The results on the 2017 audit are summarized in Appendix C.

Market Coverage

In CEEVA, the signatories established an objective to cover at least 85% of the Canadian Pay TV market. The signatories exceeded this goal in 2017 by serving 9.5 million subscribers, accounting for 85.8% of the total Pay TV market.⁷

Equipment Covered

CEEVA covers all new set-top boxes received by service provider signatories after January 1, 2017. New set-top boxes do not include any models received for the first time before that date, or any models that have been returned, repaired, or otherwise upgraded, and then deployed.

7 - Canadian Radio-television and Telecommunications Commission, “2017 Communication Monitoring Report” available at <https://crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2017/cmr2017.pdf>.

Set-Top Box Testing

To verify that the set-top boxes purchased by service provider signatories in 2017 met the Tier 1 efficiency levels, CEEVA required all set-top boxes to be tested running the service provider's software and as normally installed for the end user. Testing must be conducted by a Steering Committee approved and accredited organization with ISO 17065 or 17025 accreditation and/or recognized by the Standards Council of Canada for set-top box testing.

For the 2017 reporting year, all five service provider signatories submitted their accredited third-party testing results to the Data Aggregator. The Data Aggregator verified the test results and energy consumption values against the reported values and Tier 1 requirements. The evaluation of the test results concluded that 100% of the tested models met Tier 1 requirements.

New Feature Allowances

To keep pace with fast-changing technologies and consumer demands, CEEVA includes a process that enables parties to develop and deploy set-top boxes with new energy-consuming features without seeking advance approval of a new energy allowance for that feature. Without this flexibility, innovation and competition could be stifled as consumers could face delays in obtaining new features and services while providers would be deprived of first-mover advantages in bringing new capabilities to the market.

Beginning in 2018 for Tier 2, if a service provider deploys a set-top box which includes a new feature without an allowance and the applicable Tier levels are exceeded, it may set and report an appropriate initial allowance for the power consumption of said feature when reporting the device. The Steering Committee will review the best available evidence to set a new allowance for that feature within six months.

The only features reported in 2017 that were not covered by the applicable Tier 1 allowances were already included in CEEVA's Tier 2 allowances: Ultra High Definition (UHD-4), High Efficiency Video Processing (HEVP), DOCSIS™ 3.0, Wi-Fi Home Network Interface (W-HNI), and Multi-Input Multi-Output Wi-Fi at 5 GHz (MIMO-5). Because CEEVA has already established appropriate allowances for these features, the Data Aggregator and the Steering Committee determined that the best course was to add these Tier 2 allowances where applicable to the Tier 1 allowable maximum Typical Energy Consumption (TEC) for models that include these features.⁸ This approach will enable consistent reporting of these models to consumers as the service providers shift to Tier 2 reporting for 2018.

⁸ - CEEVA also gave service providers the option for 2017 to use the Tier 2 test method and procedures, deactivate new features for testing, or inform the Data Aggregator of the incremental power consumption of the function to be added to the applicable energy consumption targets using the Tier 2 new features process for guidance.

REPORT ON PROCUREMENT COMMITMENT

CEEVA's primary commitment is to procure energy-efficient set-top boxes, including that 90% of all new set-top boxes received by service providers in 2017 would meet the Tier 1 efficiency levels. D+R found that 100% of all new set-top boxes received by service providers in 2017 met the Tier 1 levels, and that 86.4% of these set-top boxes also met the more rigorous Tier 2 levels a year before those levels became effective in 2018.

Table 1 shows the number and percentage of set-top boxes received by service providers in 2017 that met the Tier 1 efficiency levels.

Table 1: 2017 Received Set-Top Box Units

Category	Received Units	Units Meeting Tier 1 Levels	Percentage of Units Meeting Tier 1 Levels
PVR	876,729	876,729	100%
Non-PVR	1,137,735	1,137,735	100%
Total	2,014,464	2,014,464	100%

ENERGY EFFICIENCY TRENDS AND BASELINE

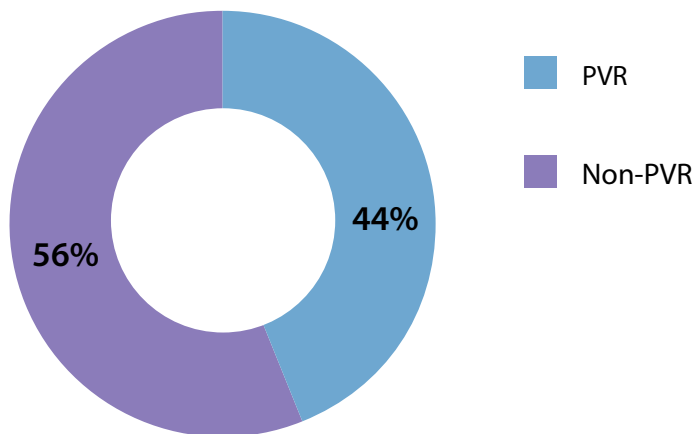
The average weighted TEC for new set-top boxes received by the service provider signatories in 2017 was 85.2 kWh/year for non-PVRs and 156.4 kWh/year for PVRs. The higher energy consumption of PVRs is attributable to the hardware used to support additional features they offer, such as video recording and playback, which are not available features in non-PVR devices.

Table 2: Weighted Average TEC, by Set-Top Box Category

Category	Average Weighted TEC (kWh/yr)
PVR	156.4
Non-PVR	85.2

As shown in Figure 1 below, 56% of new devices received by the service provider signatories were non-PVRs and 44% were PVRs.

Figure 1: Percentage of Set-Top Boxes Received in 2017, by Category



As this is the first reporting year of CEEVA, the data represented in this report can be used as a baseline and point of comparison to demonstrate the year-over-year achievements of CEEVA in future reporting years.

There are already indications that CEEVA is saving energy. The average weighted energy consumption of both PVRs and non-PVRs received by the Canadian service provider signatories in 2017 (the final year before they transition to Tier 2 levels) were lower than the corresponding energy usage reported by the signatories of the U.S. Voluntary Agreement (USVA) in 2016, the final year before the U.S. transitioned to Tier 2 in 2017, as shown in Table 3.⁹

Table 3: CEEVA and USVA Average Weighted TEC in Final Year of Tier 1

Category	Average Weighted TEC (kWh/yr)	USVA Average Weighted TEC (kWh/yr)
PVR	156.4	161.3
Non-PVR	85.2	85.6

⁹ - This comparison is supported by the fact that CEEVA and the USVA use the same ENERGY STAR V3.0 Test Method and TEC formula for Tier 1.

CONSUMER ENERGY EFFICIENCY INFORMATION

All service provider signatories committed to provide subscribers and prospective customers with reasonable access to energy efficiency information about reported set-top boxes. This information allows consumers to learn about their options for energy-efficient devices. Links to this information are shown in Appendix B and posted online at <http://www.energyefficiency-va.ca>.

CONCLUSION

CEEVA is off to a promising start in improving the energy efficiency of set-top boxes in Canada. In the first reporting year, signatories demonstrated successful deployment of energy-efficient set-top boxes, with 100% of devices meeting Tier 1 energy levels, and early adoption of Tier 2 energy levels in 86.4% of devices. This initial year of results provides a baseline upon which future energy efficiency improvements can be measured.

APPENDIX A: SET-TOP BOXES RECEIVED DURING REPORTING PERIOD

Table 4 lists the reported Typical Energy Consumption (TEC) for each model of new set-top box received by CEEVA signatories in 2017. These values are reported TEC, rather than calculated TEC. In CEEVA, service providers have the option to publish a “reported TEC” that rounds up calculated TEC values for reporting purposes to account for production variances. Modal power and 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. CEEVA calculates maximum allowable TEC for a product using the base-type allowances outlined in Table 5 and the feature allowances outlined in Table 6. Table 6 also includes descriptions of the features abbreviated in Table 4 in the “Claimed Allowances” column. CEEVA sets forth 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.

Table 4: Set-Top Boxes Received by Signatories in 2017

STBs Received by CEEVA Signatories in 2017					Claimed Allowances	Modal Characteristics (W)		TEC (kWh/yr)	Meets Tier 1	Meets Tier 2 (Early Adoption)
Service Provider	Base Type	Primary Function	Brand	Model Number		On	Sleep			
Bell Canada	Internet Protocol (IP)	Non-PVR	Arris	2502	Adv Video, HD, HNI, Multi-Stream Terr/IP	11.9	11.6	103.0	YES	YES
Bell Canada	Internet Protocol (IP)	PVR	Arris	5662	Adv Video, DVR, HD, Multi-Stream Terr/IP	13.6	12.2	113.5	YES	YES
Bell Canada	Satellite	Non-PVR	Bell	6400	APD, Adv Video, HD	7.4	7.0	62.0	YES	YES
Bell Canada	Satellite	PVR	Bell	9400	APD, Adv Video, DVR, HD, Multi-Stream Cable/Sat	14.0	13.8	122.0	YES	YES
Cogeco	Cable	PVR	Tivo	TDC848000	Adv Video, Cable CARD, DVR, HD, Multi-room, Multi-Stream Cable/Sat	18.3	17.3	160.0	YES	YES
Cogeco	Cable	Non-PVR	Arris	DCX860/R4CC/9322	Adv Video, HD	6.8	6.2	60.0	YES	YES
Cogeco	Cable	Non-PVR	Arris	DCX525/0310/001 Phase 1	Adv Video, HD	7.1	6.9	64.0	YES	YES
Cogeco	Internet Protocol (IP)	Non-PVR	Arris	DCX860/R4CC/9322 Mini	Adv Video, HD, HNI	6.6	6.0	58.0	YES	YES
Cogeco	Cable	PVR	Arris	DCX900/P68C/0322/1000 Phase 1	Adv Video, Cable CARD, DVR, HD, Multi-room, Multi-Stream Cable/Sat, HEVP, UHD-4	15.7	14.3	140.0	YES	YES
Cogeco	Cable	PVR	Pace	RNG200N	Adv Video, DVR, HD, Multi-Stream Cable/Sat	16.5	15.7	145.0	YES	NO
Rogers	Cable	PVR	Cisco	CAV10455HD	Adv Video, DVR, HD, Multi-room, Multi-Stream Cable/Sat, HEVP, UHD-4, D3	21.4	21.3	200.0	YES	YES
Rogers	Cable	Non-PVR	Cisco	CAV10242HD	Adv Video, HD, HNI, Multi-Stream Cable/Sat, HEVP, UHD-4, D3	15.5	14.3	140.0	YES	YES
Shaw	Cable	PVR	Arris	AX013ANM	APD, Adv Video, Cable CARD, DVR, HD, Multi-room, Multi-Stream Cable/Sat, D3	21.6	20.1	184.0	YES	YES
Shaw	Internet Protocol (IP)	Non-PVR	Pace	PXD01ANI	APD, Adv Video, HD, HNI	5.6	4.8	47.0	YES	YES
Shaw	Internet Protocol (IP)	Non-PVR	Cisco	CXD01ANI	APD, Adv Video, HD, HNI	5.2	4.2	44.0	YES	YES
Shaw	Cable	Non-PVR	Arris	DCX3200/A081/033	Adv Video, Cable CARD, D2, HD	12.2	10.0	105.0	YES	NO
Shaw	Cable	PVR	Arris	AX013ANM	Adv Video, Cable CARD, DVR, HD, Multi-Stream Cable/Sat, D3	20.1	19.4	180.0	YES	YES
Shaw	Satellite	Non-PVR	Arris	DSR600	Adv Video, HD	9.9	9.5	90.0	YES	NO
Shaw	Satellite	PVR	Arris	DSR630	Adv Video, DVR, HD, Multi-Stream Cable/Sat	15.8	15.7	141.0	YES	NO
Shaw	Satellite	Non-PVR	Arris	DSR800	Adv Video, HD, MIMO-5	6.7	6.3	60.0	YES	YES
Shaw	Satellite	PVR	Arris	DSR830	Adv Video, DVR, HD, Multi-Stream Cable/Sat, MIMO-5	11.9	10.9	105.0	YES	YES
Videotron	Cable DTA	Cable DTA	Cisco	DTA270HD	Adv Video, HD	5.1	5.0	50.0	YES	NO

Table 4: Set-Top Boxes Received by Signatories in 2017 (continued)

STBs Received by CEEVA Signatories in 2017					Claimed Allowances	Modal Characteristics (W)		TEC (kWh/yr)	Meets Tier 1	Meets Tier 2 (Early Adoption)
Service Provider	Base Type	Primary Function	Brand	Model Number		On	Sleep			
Videotron	Cable	Non-PVR	Cisco	4642HD	APD, Adv Video, D2, HD, HNI	16.2	13.1	125.0	YES	NO
Videotron	Cable	PVR	Cisco	9887HD	APD, Adv Video, HD, Multi-room, Multi-Stream Cable/Sat, D3	27.1	19.3	192.0	YES	YES
Videotron	Cable	Non-PVR	Technicolor	CAV10242HD	APD, Adv Video, HD, HNI, D3, UHD-4, HEVP	14.8	13.4	130.0	YES	YES
Videotron	Cable	PVR	Technicolor	CAV10455HD	APD, Adv Video, DVR, HD, Multi-room, Multi-Stream Cable/Sat, D3, UHD-4, HEVP	21.5	16.9	174.0	YES	YES
Videotron	Cable	PVR	Samsung	GX-VD940CJ	APD, Adv Video, Cable CARD, DVR, HD, Multi-room, Multi-Stream Cable/Sat, D3, UHD-4, HEVP	22.8	20.1	200.0	YES	YES

Table 5: Set-Top Box Base Allowances

Table 5 lists the base type and allowances (kWh/yr) for set-top boxes received in 2017 shown in Table 4 above.

Base Type	Tier 1 Allowance (kWh/yr)
Cable	60
Cable DTA	35
Internet Protocol (IP)	50
Satellite	70

Table 6: Set-Top Box Feature Allowances

Table 6 lists the features, feature descriptions, and allowances (kWh/yr) for set-top boxes received in 2017 shown in Table 4 above.

Feature	Description	Tier 1 Allowance (kWh/yr)
Adv Video	Advanced Video Processing	12
CableCARD	CableCARD	15
PVR	Digital Video Recorder	45
D2	DOCSIS 2.0	20
HD	High Definition	25
HNI	Home Network Interface	10
Multi-room	Multi-room	40
Multi-Stream Cable/Sat	Multi-stream - Cable/Satellite	16
Multi-Stream Terr/IP	Multi-stream - Terrestrial/IP	8
APD	Automatic Power Down	-
Tier 2 Allowances Included as Tier 1 New Feature Allowances		
D3	DOCSIS 3.0	50
HEVP	High Efficiency Video Processing	10
MIMO-5	MIMO Wifi HNI 5	4
UHD-4	Ultra High Definition - 4k	4

APPENDIX B: CONSUMER ENERGY EFFICIENCY INFORMATION

The service provider signatories committed to providing reasonable, public access to energy efficiency information for reported set-top box devices. The URLs for such information are posted below. Information for all companies is also available at <http://www.energyefficiency-va.ca>.

Table 7: Consumer Energy Efficiency Information

Service Provider	Consumer Information Location
Bell Canada	http://www.bce.ca/responsibility/corporate-responsibility/2017-cr-report/2018-bell-stb-energy-information.pdf
Cogeco	https://energyca.cablelabs.com/cogeco/?lang=en
Rogers Communications	https://energyca.cablelabs.com/rogers/?lang=en
Shaw Communications (Cable)	https://community.shaw.ca/docs/DOC-11219
Shaw Communications (Satellite)	http://www.shawdirect.ca/english/support/article?articleid=8389&languageid=1033
Videotron	https://energyca.cablelabs.com/Videotron/?lang=en



CEEVA requires service provider signatories to submit annual procurement data to the Data Aggregator, D+R, which collects and analyses the data, and publishes the results in an annual report. To protect confidential information, all data in the annual report is aggregated. In order to verify the accuracy of the submitted information from each service provider, CEEVA also requires an annual audit of one service provider's procurement figures. Each year, a service provider is selected at random to be subject to the audit.

The Data Aggregator conducted an audit of the 2017 procurement data, which was used to develop the findings published in the 2017 annual report. The service provider was selected at random using the "random" function in Excel, and was prompted to provide the Data Aggregator a list of all new set-top boxes received in 2017, as well as shipment details and specification sheets for each model procured.

D+R, as the Data Aggregator, has determined that the data submitted by the service provider for the audit is consistent with the annual report submitted by that party.

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