

2018 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 2018, published by the appointed independent Data Aggregator, D+R International, Ltd. (D+R), is the second report published under CEEVA.

In the first year, CEEVA required that at least 90% of all new set-top boxes received by the service provider signatories after January 1, 2017 met the Tier 1 efficiency levels established in the ENERGY STAR® V3.0 Program Requirements. In its first report, D+R found that 100% of all new set-top boxes received in 2017 met the Tier 1 efficiency levels.

Beginning January 1, 2018, the service provider signatories committed that 90% of their purchases of new set-top boxes would meet more rigorous Tier 2 efficiency levels as defined in Annex B of CEEVA. In this report, D+R finds that this commitment was met, with 97% of all new set-top boxes meeting the Tier 2 efficiency levels.³

In addition to meeting the efficiency levels 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. D+R oversees these commitments 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 2018 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 10.9 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. They also support a variety of services such as program guides, Personal Video Recorders (PVR), and multi-room viewing; all of 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 which are updated frequently to deliver the newest services to customers.

All set-top boxes require power to operate. To help improve the energy efficiency of these devices, five of the largest Pay TV service providers, manufacturers of set-top boxes, and other supporting organizations participate 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 2018 are classified into two categories:

- **Personal Video Recorder (PVR):** Set-top boxes with features that enable recording and playback of video content from a local hard disk drive or other local storage.⁶
- **Non-PVR:** Set-top boxes that do not include a local hard disk drive or other local storage for 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 while supporting the customer experience. In doing so, CEEVA aims to improve the health of Canada's natural environment and reduce its carbon footprint in a manner that neither disrupts the Pay TV industry from providing high-quality services that Canadian consumers demand, nor stifles 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
- DISH Technologies
- Technicolor

4 - Total Canadian subscriber count was calculated by taking the 11 million subscribers reported at the end of 2017, taken from the Canadian Radio-television and Telecommunications Commission, "2018 Communication Monitoring Report" available at <https://crtc.gc.ca/pubs/cm2018-en.pdf> (pg. 262), and applying a 0.9% reduction factor, taken from the Canadian Radio-television and Telecommunications Commission, "2017 Communication Monitoring Report" available at <https://crtc.gc.ca/eng/publications/reports/policymonitoring/2017/cm2017.pdf> (pg 192).

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. Its purpose includes ensuring that the following goals of CEEVA are met:

- Guaranteeing a made-in-Canada agreement and standards that take 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,
- Promoting innovation and avoiding disruption of the Canadian market or Canadian consumers.

Additionally, the Steering Committee selects the Data Aggregator responsible for compiling reporting data from each signatory and publishing the annual report. D+R was appointed as the Data Aggregator in 2017, and has continued in this role in 2018.

Service Provider Commitments

The service providers’ primary commitment under CEEVA is that 90% of the new set-top boxes they receive each year will meet CEEVA’s energy efficiency levels. The applicable efficiency levels became more rigorous in 2018, in accordance with CEEVA’s “Tier 2” commitments. Service providers also committed to provide information to consumers about the general energy consumption characteristics of set-top boxes and 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 of the 2018 audit are summarized in Appendix C.

Market Coverage

In CEEVA, the signatories established an objective to cover at least 85% of the residential Canadian Pay TV market. The signatories met this goal in 2018 by serving almost 9.4 million subscribers,⁷ accounting for approximately 86% of the total residential Pay TV market.⁸

7 - Signatory market coverage was calculated based on publically available quarterly reports from each signatory.

8 - See supra n.5.

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.

Set-Top Box Testing

To demonstrate that the set-top boxes purchased by service provider signatories in 2018 met the Tier 2 efficiency levels, CEEVA required all set-top boxes to be tested running the service provider's software as it is normally installed for the end user. Testing must be conducted by a Steering Committee-approved organization with ISO 17065 or 17025 accreditation and/or recognized by the Standards Council of Canada for set-top box testing.

For the 2018 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 2 requirements. All models tested at or below the energy consumption values reported by signatories. The evaluation of the test results against Tier 2 efficiency levels concluded that all but one model met Tier 2.

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.

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. In 2018, there were no new feature allowances reported by signatories.

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, and that 90% of all new set-top boxes received in 2018 would meet more stringent Tier 2 efficiency levels. As previously reported, D+R found that 100% of the new set-top boxes received by service providers in 2017 met the required Tier 1 levels, and 86% met the more rigorous Tier 2 levels that were not yet in effect. In 2018, when Tier 2 went into effect, 97% of the new set-top boxes received by service providers met the Tier 2 efficiency levels.

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

Table 1a: 2017 Received Set-Top Box Units

Year	Category	Received Units	Units Meeting Tier 1 Levels	Percentage of Units Meeting Tier 1 Levels
2017	PVR	876,729	876,729	100%
	Non-PVR	1,137,735	1,137,735	100%
Totals		2,014,464	2,014,464	100%

Table 1b shows the number and percentage of set-top boxes received by service providers in 2018 that met the more stringent Tier 2 efficiency levels that took effect in 2018.

Table 1b: 2018 Received Set-Top Box Units

Year	Category	Received Units	Units Meeting Tier 2 Levels	Percentage of Units Meeting Tier 2 Levels
2018	PVR	894,532	840,668	89%
	Non-PVR	1,133,194	1,133,194	100%
Totals		2,027,726	1,973,862	97%

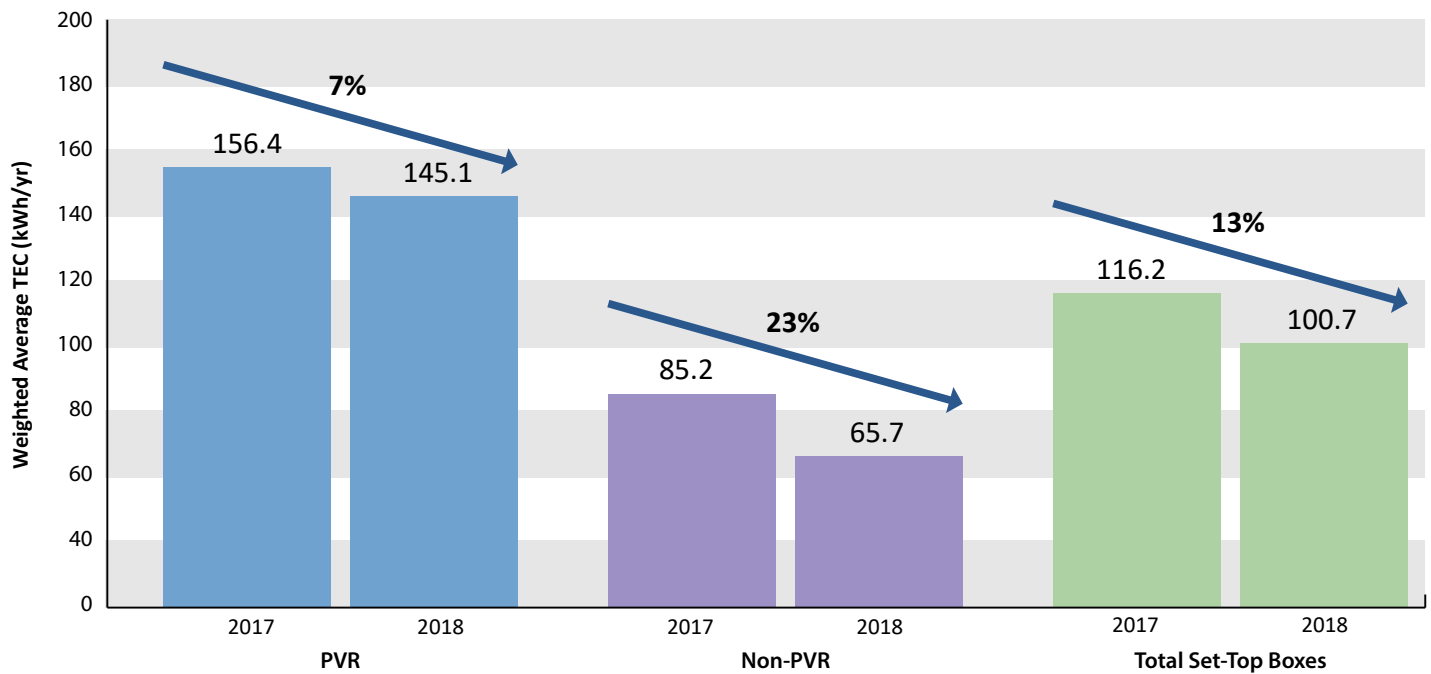
ENERGY EFFICIENCY TRENDS AND BASELINE

The weighted average TEC for new set-top boxes received by the service provider signatories in 2018 was 65.7 kWh/year for non-PVRs and 145.1 kWh/year for PVRs. 2017 marked the first year of the Agreement, and the Steering Committee unanimously agreed to use 2017 data as a baseline for measuring future energy efficiency trends. As shown in Table 2 and Figure 1, decreases in Typical Energy Consumption (TEC)⁹ can be seen in both the PVR and non-PVR categories when compared to 2017, which is particularly noteworthy given customers' continued demand for increased functionality in these devices. The percent change in both categories demonstrates that the Agreement is effectively helping to promote energy efficiency in set-top boxes, and in only two years, signatories have made significant strides in reducing the TEC of set-top boxes received.

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

Category	Weighted Average TEC (kWh/yr)		Percent Change
	2017	2018	2017-2018
PVR	156.4	145.1	-7%
Non-PVR	85.2	65.7	-23%
Total Set-Top Boxes	116.2	100.7	-13%

Figure 1: Weighted Average TEC, by Set-Top Box Category

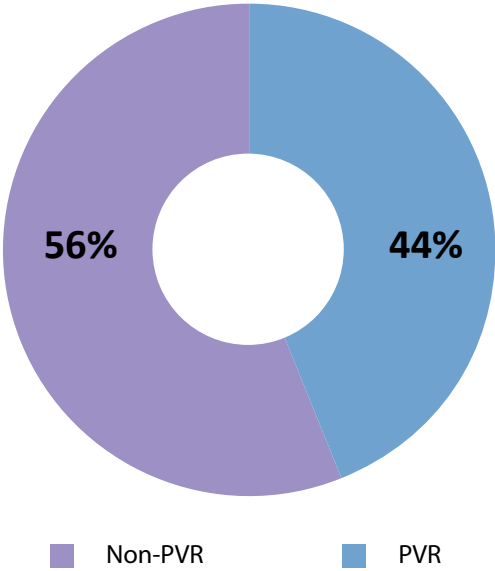


These reductions in power represent a positive start for CEEVA. D+R will continue to track progress in future reports to identify trends as the signatories remain committed to improving the energy efficiency of their devices.

⁹ -TEC is the product of a method for evaluating energy consumption through a calculation of the expected energy consumption for a typical set-top box over a one-year period, expressed in units of kWh/year.

As shown in Figure 2 below, 56% of new devices received by the service provider signatories were non-PVRs and 44% were PVRs in 2018. The category breakdown between non-PVR and PVR devices remained consistent between 2017 and 2018.

Figure 2: Percentage of Set-Top Boxes Received in 2018, by Category



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

The implementation of CEEVA is off to a successful start with a decline in the weighted average power of new set-top boxes by 13%, and with 97% of devices meeting Tier 2 energy levels.

APPENDIX A: SET-TOP BOXES RECEIVED DURING REPORTING PERIOD

Table 3 lists the reported TEC for new Tier 2 set-top box models received by CEEVA signatories in 2018. 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 4 and the feature allowances outlined in Table 5. Table 5 also includes descriptions of the features abbreviated in Table 3 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 3: Tier 2 Set-Top Boxes Received by Signatories in 2018

Tier 2 Set-Top Boxes Received by Signatories in 2018					Claimed Allowances	Modal Characteristics (W)		TEC (kWh/yr)
Service Provider	Base Type	Primary Function	Brand	Model No.		On	Sleep	
Bell	IP	Non-DVR	ARRIS	2502	Adv Video, HD, HNI, MS, MS-A, W-HNI, MIMO-5(4)	11.9	11.6	103.2
Bell	IP	DVR	ARRIS	5662	Adv Video, DVR, HD, HNI, MS, W-HNI, MIMO-5(4)	13.5	12.2	117.7
Bell	Satellite	Non-DVR	Dish Technologies	6400	Adv Video, HD	7.4	7.0	62.3
Bell	Satellite	DVR	Dish Technologies	9400	Adv Video, DVR, HD, MS	14.0	13.8	122.0
Bell	Satellite	DVR	Dish Technologies	9500	Adv Video(2), DVR, HD, HNI, M-HNI, S-DVR, MS, HEVP	14.2	13.8	122.6
Cogeco	Cable	DVR	ARRIS	DCX900/ P68C/0322/ 1000 Phase 1	Adv Video, CableCARD, DVR, HD, M-HNI, Multi-room, MS, MS-A, HEVP, UHD-4	17.8	14.1	143.0
Cogeco	Cable	Non-DVR	ARRIS	DCX860/ R4CC/9322	Adv Video, HD	6.8	6.3	60.0
Cogeco	IP	Non-DVR	ARRIS	DCX860/ R4CC/9322 Mini	Adv Video, HD, HNI, M-HNI	5.7	4.9	50.0
Cogeco	Cable	Non-DVR	ARRIS	DCX525/ 0310/001 Phase 1	Adv Video, HD	7.2	6.9	61.6
Rogers	Cable	DVR	Technicolor	CAV10455HD	Adv Video(2), DVR, D3, HD, HNI, M-HNI, S-DVR, MS, MS-A, HEVP, UHD-4	23.8	20.6	200.0
Rogers	Cable	Non-DVR	Technicolor	CAV10242HD	Adv Video, D3, HD, HNI, M-HNI, MS, HEVP, UHD-4	16.0	13.7	140.0
Rogers	IP	Non-DVR	ARRIS	AX061AEI	Adv Video, HD, HNI, W-HNI, MIMO-2.4(2), MIMO-5(2), HEVP, UHD-4	5.2	3.4	42.0
Shaw	Cable	DVR	ARRIS	AX013ANM- XG1V3-0933	Adv Video, CableCARD, DVR, D3, HD, Multi-room, MS, MS-A	21.3	19.2	184.0
Shaw	Cable	DVR	ARRIS	AX014ANM- XG1V4	Adv Video, DVR, D3, HD, Multi-room, MS, MS-A, HEVP	16.7	14.7	155.0
Shaw	IP	Non-DVR	ARRIS	AXD01ANI	Adv Video, HD, HNI, M-HNI	5.5	4.3	47.0
Shaw	IP	Non-DVR	Technicolor	CXD01ANI	Adv Video, HD, HNI, M-HNI	5.1	3.9	44.0
Shaw	Satellite	Non-DVR	ARRIS	DSR800	Adv Video, HD, MIMO-5(2)	7.2	6.5	65.0
Shaw	Satellite	DVR	ARRIS	DSR830	Adv Video, DVR, HD, MS, MIMO-5(2)	12.3	11.5	110.0
Videotron	Cable	Non-DVR	Technicolor	CAV10242HD	Adv Video, D3, HD, HNI, M-HNI, MS, HEVP, UHD-4	15.3	13.6	130.0
Videotron	Cable	DVR	Technicolor	CAV10455HD	Adv Video, DVR, D3, HD, HNI, M-HNI, S-DVR, MS, MS-A, HEVP, UHD-4	22.4	17.0	174.0
Videotron	Cable	DVR	Samsung	GX-VD940CJ	Adv Video, CableCARD, DVR, D3, HD, HNI, M-HNI, S-DVR, MS, MS-A, HEVP, UHD-4	23.1	20.9	200.0

Table 4: Set-Top Box Base Allowances

Table 4 lists the base type and allowances (kWh/yr) for set-top boxes received in 2018 shown in Table 3.

Base Type	Tier 2 Allowance (kWh/yr)
Cable	45
Internet Protocol (IP)	45
Satellite	50

Table 5: Set-Top Box Feature Allowances

Table 5 lists the features, feature descriptions, and allowances (kWh/yr) for set-top boxes received in 2018 shown in Table 3.

Feature	Description	Tier 2 Allowance (kWh/yr)
Adv Video	Advanced Video Processing	8
APD	Automatic Power Down	-
CableCARD	CableCARD	15
D3	DOCSIS 3.0	50
PVR	Digital Video Recorder	45
HD	High Definition	12
HEVP	High Efficiency Video Processing	10
HNI	Home Network Interface	10
M-HNI	MoCa Home Network Interface	12
MIMO-2.4	MIMO Wifi HNI 2.4	2
MIMO-5	MIMO Wifi HNI 5	4
MS	Multi-Stream	8
MS-A	Multi-Stream Additional	8
MR	Multi-Room	40
S-PVR	Shared PVR	20
W-HNI	WiFi HNI	15

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 6: Consumer Energy Efficiency Information

Service Provider	Consumer Information Location
Bell Canada	www.energyefficiency-va.ca/wp-content/uploads/2019/08/Bell-En-2019.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 2018 procurement data, which was used to develop the findings published in the 2018 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 2018, 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.

August 14, 2019



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