July 29, 2013

VIA EMAIL

California Energy Commission
Docket Office, MS-4
Re: Docket No. 12-AAER-2A
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 12-AAER-2A 2012 Rulemaking on Appliance Efficiency Regulations
Consumer Electronics

Dear Commissioners:

The California Cable & Telecommunications Association and the National Cable & Telecommunications Association hereby submit the attached proposal pursuant to the Invitation to Submit Proposals released in the above-referenced docket on June 13, 2013.

Sincerely,

/s/ Lesla Lehtonen

/s/ Neal M Goldberg

Lesla Lehtonen
Senior Vice President and General Counsel
California Cable & Telecommunications Association
1001 K Street, 2nd Floor
Sacramento, CA 95814
916/446-7732

Neal M. Goldberg
Vice President and General Counsel
National Cable & Telecommunications Association
25 Massachusetts Avenue, N.W.
Suite 100
Washington, D.C. 20001-1431
202/222-2445

Attachments

Proposal for Standards – Set-Top Boxes

Appliance Efficiency Standards and Measures

for California Energy Commission's Invitation to Submit Proposals

Lesla Lehtonen, Sr. VP, General Counsel
CALIFORNIA CABLE & TELECOMMUNICATIONS ASSOCIATION
1001 K Street, 2nd Floor
Sacramento, CA 95814

Rick Chessen, Sr. VP, Law & Regulatory Policy
Neal M. Goldberg, VP, General Counsel
William A. Check, Ph.D., Sr. VP, Science & Technology and Chief Technology Officer
Andy Scott, VP, Engineering
Jim Partridge, VP, Industry & Technical Analysis
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 Massachusetts Avenue, N.W. – Suite 100
Washington, DC 20001-1431

Paul Glist, Counsel to CCTA and NCTA
Davis Wright Tremaine LLP
1919 Pennsylvania Avenue N.W., Suite 800
Washington, DC 20006-3401

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1. Executive Summary (Template Section 1)

The Commission has invited interested stakeholders to submit proposals for standards, test procedures, labeling requirements, and/or other measures that will improve the efficiency and reduce the energy consumption of set-top boxes. But the Commission is preempted by federal law from adopting any technical standards, such as energy standards or test procedures, with respect to set-top boxes provided by cable operators. The U.S. Supreme Court, Congress, and the Federal Communications Commission have all made clear that, under the federal Cable Act, no state may prohibit, condition or restrict a cable system's use of any type of subscriber equipment, because, as Congress put it, "a patchwork of regulations that would result from a locality-by-locality approach is particularly inappropriate in today's intensely dynamic technological environment."[1] The Commission abandoned consideration of regulating cable set-top boxes in the face of this argument before, and should do so again.

In any event, the industry has secured substantial energy conservation and consumer education measures through the landmark Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes ("Voluntary Agreement"). The Voluntary Agreement was entered into by fifteen industry leaders representing all of the major multichannel video programming distributors (MVPDs) in the United States serving more than 90 million American households and 90% of Pay TV consumers, including all of the largest MVPDs in California, as well as several manufacturers of navigation devices and set-top boxes. CCTA and NCTA previously demonstrated that the Voluntary Agreement will accomplish the objectives of the Warren-Alquist Act in a manner superior to regulation in their comments in response to the Invitation to Participate in this docket. Those May 9, 2013 comments are attached hereto and incorporated as if set forth within this proposal.[2]

For these reasons, CCTA and NCTA propose that the Commission decline to adopt any regulations with respect to cable set-top boxes.

2. Federal Preemption: Federal Law Preempts State Regulation of Cable Operator Set-top Boxes (Template Section 12)

The federal Cable Act preempts states from conditioning or restricting the use of set-top boxes and other subscriber equipment by cable operators.[3] In September 2004, after considering the adoption of appliance efficiency standards for set-top boxes in Docket 03-AAER-1, the Commission, in the face of arguments that the State of California was federally preempted from adopting such state-specific standards, excluded set-top boxes from further consideration. The

[1] *See* H.R. Rep. No. 104-204, at 110 (1995).

[2] *See* Exhibit 3

[3] *See* 47 U.S.C. § 556(c).

Commission should again exclude cable set-top boxes and other subscriber equipment used in cable systems from its current rulemaking.

The Cable Act preempts not only inconsistent state law, but all state regulation of cable subscriber equipment. Before 1996, the Act authorized state regulation of cable systems' technical operation that was consistent with federal law, but in a 1996 amendment to the Act Congress replaced that with an express proviso that no state or local authority may prohibit, condition or restrict a cable system's use of any type of subscriber equipment. Specifically, Section 624(e) of the Act now provides:

> **Technical Standards**: Within one year after October 5, 1992, the Commission shall prescribe regulations which establish minimum technical standards relating to cable systems' technical operation and signal quality. The Commission shall update such standards periodically to reflect improvements in technology. *No state or franchising authority may prohibit, condition or restrict a cable system's use of any type of subscriber equipment or any transmission technology*.[4]

Congress, as well as the FCC in subsequent orders,[5] has made it abundantly clear that Section 624(e) precludes states from regulating in the areas of technical standards, customer equipment, and transmission technologies.

It should be enough in this proceeding to argue simply that the Commission is preempted, regardless of the reasons why Congress made that choice. But the Commission can also take note of the reasons why preemption is vital to effective public policy in this case.

Even before Congress adopted the revisions to Section 624(e) above, the Supreme Court succinctly explained why the FCC must have the authority to preempt state and local technical standards for cable systems. In *City of New York v. FCC*, 486 U.S. 57 (1988), the Court quoted with approval FCC findings that:

- "[A] multiplicity of mandatory and nonuniform technical requirements undermined 'the ultimate workability of the over-all system,' and could 'seriously imped[e]' the 'development and marketing of signal source, transmission, and terminal equipment.'"[6]

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[4] 47 U.S.C. § 544(e) (emphasis added).

[5] *See, e.g., Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996*, Report and Order, CS Docket No. 96-85, 14 FCC Rcd. 5296 at ¶¶ 131-32 ("*Cable Act Reform Order*").

[6] *City of New York v. FCC*, 486 U.S. 57, 60 (1988) (quoting *Cable Television Report and Order*, 49 F.C.C.2d 470, 478-79 (1974)).

- "Technical standards that vary from community to community create potentially serious negative consequences for cable system operators and cable consumers in terms of the cost of service and the ability of the industry to respond to technological changes."[7]

The legislative history of Section 624(e) leaves no doubt about its extent or purpose. Congress was particularly concerned that state regulation would impede technological development: "The Committee intends by this subsection to avoid the effects of disjointed local regulation. The Committee finds that the patchwork of regulations that would result from a locality-by-locality approach is particularly inappropriate in today's intensely dynamic technological environment."[8] Likewise, in its *Cable Act Reform Order*, the FCC stated, "uniformity of technical standards … is essential to prevent the inefficiency and confusion that threatened the cable industry during the period when local authorities … could set stricter standards than those promulgated by the Commission."[9]

In 1996, the FCC applied that preemption order and held that proposed state and local restrictions on set-top boxes in New Hampshire and North Carolina were preempted—even when one of the proposals sought to impose conditions and restrictions on digital technology and the use of converter boxes "to the extent consistent with FCC rules and regulations."[10] The FCC held that Section 624 of the Communications Act grants the FCC the exclusive authority to establish technical standards relating to a cable system's technical operation. It noted that the 1996 Act adopted the specific prohibition that "No State or franchising authority may prohibit, condition, or restrict a cable system's use of any type of subscriber equipment or any transmission technology."[11] "Regardless of any ambiguity that may have previously existed regarding the question raised by the New Hampshire Committee and Chapel Hill [concerning the preemption of states from regulating cable set-top boxes]," wrote the Commission, "Congress has now addressed the matter."[12] It refused to permit the state restrictions.

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[7]*Id.* at 65 (quoting *Review of the Technical and Operational Requirements of Part 76, Cable Television*, Report and Order, MM Docket No. 85-38, 59 RR2d 569, 50 Fed. Reg. 52462 (1985)).

[8]*See* H.R. Rep. No. 104-204, at 110 (1995).

[9]*Cable Act Reform Order* at ¶ 127 (citing *Competition, Rate Deregulation and the Commission's Policies Relating to the Provision of Cable Television Service*, Report, MM Docket No. 89-600, 5 FCC Rcd 4962, 5056 (1990)).

[10]*In Re Committee on Science, Technology and Energy of the New Hampshire House of Representatives and Town of Chapel Hill, North Carolina*, Memorandum Report and Order, CSR-4291-Z, 11 FCC Rcd 10250, 10251 ¶ 2 (1996).

[11]*Id.* at 10253 ¶ 8.

[12]*Id.* at ¶ 9.

In addition, state-by-state regulations would conflict with how cable operators purchase and provision their equipment today. Large national cable providers like Comcast, Time Warner Cable, Cox and Charter offer services across wide swaths of the country. To do so, these operators acquire set-top boxes in volume on a nationwide basis to achieve economies of scale and scope that can facilitate greater innovation and investment, and utilize warehouses to supply multi-state regions with equipment. Furthermore, cable operators develop technical designs, firmware and software updates, and new applications through centralized research and development on a national level.

Preemption is also fundamental to preserving an environment conducive to innovation and competition. To date, the FCC has left energy efficiency issues to voluntary ENERGY STAR set-top box specifications promoted by the U.S. Department of Energy and the U.S. Environmental Protection Agency. It continues to exercise its preemptive authority to assure that cable operators can rapidly introduce innovative features without the impediment of state or local law. In 2011, for example, the FCC preempted a claim brought under California law when a cable operator changed the particular program offered in one of its program packages.[13] The FCC explained that federal preemption is intended to prevent the application of more restrictive rules that can thwart the rapid introduction of new services in a dynamically changing marketplace.[14] Today, the FCC is engaged in a rulemaking on cable technical standards, including the network-CPE (customer premises equipment) relationship and interface.[15] But these rules continue to operate nationally and, under Congressional requirements, exclusively at the federal level to protect and preserve an environment for rapid innovation.

Preemption is especially important today to protect the dramatic consumer benefits that come with rapid innovation. As we have previously explained, set-top boxes are extensions of highly-complex, rapidly-changing video distribution networks. The market today moves even more quickly than it did in 1992, reflecting the intensity of competition among service providers and the dynamic nature of technological innovation. Appliance efficiency regulation is designed for standalone products that consumers own and rarely replace, and that operate under stable conditions and perform basically one function in the consumer's home over their long lifetimes. If set-top boxes were subject to state regulation designed for such static products, innovation, consumer choice and competition would be stifled. Set-top boxes and the video services with which they are integrated evolve far more quickly than appliances typically

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[13] *Petition for a Declaratory Ruling Regarding Negative Option Billing Restrictions of Section 623(f) of the Communications Act and the FCC's Rules and Policies*, Declaratory Ruling, MB Docket No. 10-215, 26 FCC Rcd 2229 ¶ 13 (MB Mar. 1, 2011).

[14] *Id.* at ¶ 5.

[15] *See Cable Television Technical and Operational Requirements*, Notice of Proposed Rulemaking, MB Docket No. 12-217, 27 FCC Rcd 9678 (2012).

regulated by the Commission. An energy ceiling for set-top boxes as they exist in 2013 – and even allowances for features known today – cannot keep up with the rapid invention and the addition of new features. It would be untenable as a matter of public policy for service providers to hold back new functionalities from consumers until they could secure a waiver or rule change or squeeze the power consumption of the new feature into energy allowances designed for set-top boxes without such features. Such a result would paralyze innovation and new services, and deprive competitors of any first-mover advantage that so often motivates investment and development. The obstacles are even greater if such regulation occurs at a state or local level, by creating multiple and possibly inconsistent regimes each of which must be navigated before innovation and competition can proceed.

State regulation is inappropriate and ill-suited for cable technical standards in general, and States are expressly preempted from imposing any condition or restriction on any type of cable subscriber equipment, including set-top boxes. Because the federal Cable Act does not permit state regulation of technical standards, any Commission restriction on energy consumption, test procedure or other energy-related regulation would be an impermissible restriction on a cable operator's use of set-top boxes.[16] Efforts to apply California-specific technical standards to cable set-top boxes would create precisely the inefficiency and confusion Congress and the FCC have endeavored to avoid, and would undermine the national equipment market which has long been required for cable television equipment.

3. Proposal: The Voluntary Agreement Will Accomplish the Commission's Energy Efficiency Objectives More Effectively Than Regulation (Template Section 6)

3.1. Summary of Proposal

CCTA and NCTA propose that the Commission must as a matter of federal law and should as a matter of State law and sound public policy stand down from consideration of imposing any regulations on cable operator set-top boxes. The Voluntary Agreement is already securing the energy savings sought by the IOUs at the inception of the Commission's current investigation.[17] The Voluntary Agreement can adapt quickly and flexibly to changes in technology and the marketplace to seize new opportunities for energy efficiency, while avoiding the many risks of state government intervention: erosion of the consumer benefits from rapid innovation, reduction in the efficacy of video devices and services, suppression of new services and competition, and fractured and inconsistent state rules that hobble the

[16] *See* 47 U.S.C. § 544(e).

[17] Comments of the California Cable & Telecommunications Association and the National Cable & Telecommunications Association, Docket No. 12-AAER-2A, May 9, 2013, at 18-23 ("CCTA/NCTA May 9, 2013 Comments") (demonstrating that the Voluntary Agreement will produce savings that exceed those sought by the California IOUs in their September 30, 2011 Proposal Information Template for: Set-Top Boxes and Small Network Equipment filed in Docket No. 11-AAER-1).

continued development of an efficient market for set-top boxes. As a matter of sound policy and adherence to the Warren-Alquist Act, given that the industry is already committed to saving consumers billions of dollars in electricity more quickly and effectively than regulatory approaches, the Commission and consumers have far more to gain – in immediate energy savings, innovation, and competition – than to lose by giving the Voluntary Agreement a chance to work. In any event, as a matter of federal law, state regulation of cable set-top boxes is preempted by the Cable Act.

3.2. Implementation Plan

The eleven service providers that signed the Voluntary Agreement (the "Service Provider Signatories") are actively engaged in implementing its various provisions and commitments in collaboration with their equipment suppliers, the largest of whom are also signatories. These parties are already ahead of schedule in implementing their commitment that 90% of their new set-top boxes meet the Energy Star 3.0 (ESv3) specifications after December 31, 2013. Over 70% of the cable industry's newest purchases and installations are already ESv3 compliant.

The Voluntary Agreement includes much more than the ESv3 commitments. Cable operators have downloaded "light sleep" energy efficiency capabilities to approximately 1.5 million California set-top boxes that are already in homes, saving California consumers an additional $ 8 million annually. Participating Service Provider Signatories also are providing "automatic power down" or similar energy efficiency features in millions of other set-top boxes, and are making energy efficient whole-home and network-based DVR solutions available nationwide as an alternative to multiple in-home DVRs. Cable operators are on track to field-test next generation cable set-top boxes with an even more reduced power consumption mode in 2014 and deploy them if successful.

The parties to the Voluntary Agreement have also committed to pursue additional savings above and beyond the ESv3 commitments, which were only a starting point. The Voluntary Agreement created a dynamic structure that will assure continuous reassessment as science advances and the market changes. The Signatories have engaged this year in extensive deliberations and analysis and consulted with energy conservation advocates in an effort to identify a new phase of energy-standards commitments that will exceed the current ESv3 standards.

In its prior comments, NCTA demonstrated that the ongoing implementation of the first phase of the Voluntary Agreement – the commitment that 90% of new set-top boxes will meet the standards of ESv3 – will result in annual residential electricity savings of at least $1.5 billion nationwide. A summary of the Voluntary Agreement and its benefits is attached as Exhibit 1. Approximately 12% of the improved set-top boxes would be located in California, and additional dollar savings would occur in California due to the higher average cost of electricity.

Thus, nearly 15 percent of the reduction in energy expenditures would occur in California, saving approximately $233 million per year for the state's consumers and 1.5 TWh of energy.[18]

California Annual Energy Savings Under ESv3 Commitments of Voluntary Agreement

	Millions of STBs in California	TEC TWh/yr. under prior Business as Usual	TEC TWh/yr. under VA	California Savings from VA (in TWh/yr.)	Annual Savings Value (@16¢ per kWh)
Cable	14.2	2.5	1.7	0.8	$126M
Non-Cable	14.3	3.1	2.4	0.7	$107M
TOTAL	28.5	5.6	4.2	1.5	$233M

Through the Voluntary Agreement, industry has dramatically improved energy efficiency. Without a CEC mandate, the industry has already adopted ESv3 as its standard – the very standard the IOUs and energy advocates asked the CEC to impose.[19] Through these early efforts the market will be transformed without threatening innovation or competition. Legacy set-top boxes will be replaced through the normal operation of the market: because set-top boxes are leased, rather than owned, consumers return or replace them if they upgrade service, discontinue service, switch to a retail set-top box, change service providers, or just want a different box.[20]

These are verifiable savings on which the Commission can rely. The Voluntary Agreement provides a window that will enable the public to closely track compliance and the progress of the energy savings promised by the Voluntary Agreement. The Voluntary Agreement adopted processes for verification of set-top box performance in the field,[21] with

[18]This calculation assumes an average cost of 16 cents per kWh, taken from the Commission's Energy Almanac. *See* http://energyalmanac.ca.gov/electricity (citing U.S. Energy Information Administration, Electric Power Monthly (with Data for May 2013), at 115, Table 5.6.A).

[19]*See supra* n. 16.

[20]Returned boxes with a useful life remaining can remain in service. Under FCC rules, cable operators offer set-top boxes at cost-based monthly lease rates. The lease rates are kept low because costs are spread premised on the continued use of the set-top through their useful life. In other contexts, the FCC has found that it would be wasteful to require cable operators to prematurely retire set-top boxes because of a rule change. *Commercial Availability of Navigation Devices*, Order on Reconsideration, 14 FCC Rcd. 7,596 ¶ 35 (1999) (Rule change for set-top boxes was "not … intended to render equipment obsolete that has already been manufactured and deployed and still has a useful life."). *See also Midcontinent Cable Co.*, CSR-5462-Z, MO&O, DA 00-840, 15 FCC Rcd. 6244 (2000) ("It is clear from the legislative history that cable operators, and ultimately subscribers, were not intended to bear the costs of replacing equipment prior to the end of its useful life.")

[21]*See* Exhibit 1, Voluntary Agreement at § 8.2.

compliance monitored by an Independent Administrator and each participant subject to audit.[22] The results of these measures will be transparent and available to the public through an annual report that will be released to the public.[23] This report will identify participating members during the reporting period, the number of video customers served by Service Providers Signatories, efficiency gains under the Voluntary Agreement compared with an appropriate business-as-usual base case, a narrative of trends, and a list of new set-top box models, features, modal power use (e.g., on, sleep, deep sleep) and annual energy use (TEC). Consumers will also be able to view power consumption information for new set-top boxes on web postings made by each company.[24]

3.3. Proposed Test Procedure: The Voluntary Agreement and CEA-2043 Offer a Superior and More Practical Test Procedure

The Voluntary Agreement utilizes the CEA-2043 test procedure. CEA-2043, adopted in June 2013, was developed and vetted by experts from industry, government, and elsewhere under the formal, open standards-setting process of ANSI. CEA-2043 is superior to government-imposed test procedures because, among other reasons, it can be changed far more often and quickly to meet the ongoing and inevitable future changes that will come to this market.

NRDC is mistaken when it informs the Commission that alternative test procedures being considered by DOE and EPA "are essentially 90% identical [to CEA-2043] and have slight differences on how to treat additional features like built in modems, and headless gateways."[25] DOE's test procedure may share many of the same words as are in CEA-2043, but its differences would lead to significant problems. For example, DOE's proposed test procedure would treat every different combination of software and hardware as a new set-top box model, would lead to the designation of thousands of "models" of set-top boxes each of which would have to be tested separately with each update, a crushing and time-wasting burden for every MVPD. As another example, there is widespread agreement – from NCTA to the California IOUs – that DOE should not include duty cycles in any test procedure. The California IOUs explained:

> As proposed, the DOE test method would provide a disincentive for market actors to develop innovative approaches to reducing set-top box energy

[22] *Id*. at §§ 7, 8.

[23] *Id*. at §§ 7.6, 10.1.1.2, Annex 8.

[24] *Id*. at § 7.5. Since some models of an operator's set-top boxes only work with some headends, consumer facing web postings are currently designed not to suggest a Motorola set-top box to a customer served by a Cisco headend. This is why the power consumption information may be reported in categories to avoid customer confusion.

[25] Comments of NRDC on Set Top Boxes and Small Network Equipment, Docket No. 12-AAER-2A, May 9, 2013, at 3 ("NRDC May 9, 2013 Comments").

> consumption through duty cycle improvements. Such innovations may include the following: user friendly ways to shorten auto-power-down times, schedule deep sleep during the middle of the night, reduce the number of shows recorded on DVRs by offering more unicast programming, offer long-term shut-down modes for set-top boxes in seasonal vacation homes, educate consumers about how their behavior impacts set-top box energy consumption, or automatically power down the set-top box just after the television powers down using existing power state sharing standards.[26]

The DOE test procedure would not give credit for reduced energy usage due to sleep performed at a pre-scheduled time, and would not permit MVPDs to introduce new features that could not fit within energy caps crafted for devices without those features. Innovation, consumer choice and competition would be stifled as manufacturers and MVPDs would remain handcuffed to outdated rules that, by the nature of the regulatory process, cannot quickly be changed. The Voluntary Agreement and CEA-2043 offer a superior and more practical alternative.

3.4. Proposed Regulatory Language

For the reasons stated above, no regulations should be adopted. Should the Commission reach a different preliminary conclusion and not terminate this proceeding at this stage, it should make all proposals available online and give stakeholders a sufficient opportunity to respond before the preparation of any Staff Report.

4. Economic Analysis: DOE's NODA is Fatally Flawed and Does Not Provide Support for Regulation of Set-top Boxes (Template Section 8)

Some parties have wrongly suggested that the Commission can look for support for standards from the U.S. Department of Energy's Notice of Data Availability (NODA). The NODA was a preliminary release of information that DOE did not assert was ripe to be used in support of any rules or standards for set-top boxes. NCTA has attached as Exhibit 2 an analysis that debunks the NODA. The analysis was prepared by Mr. Everett Shorey for NCTA and the Consumer Electronics Association. Mr. Shorey is the author of the Government Regulatory Impact Model (GRIM) now used by DOE as part of the assessment of the potential impact of regulations on manufacturers.

Mr. Shorey concluded that the "DOE regulatory and analytical structure [on which the NODA is premised] is fatally flawed with respect to home entertainment and can neither be

[26]IOU Comments at 29.

used nor adapted to be used for set-top boxes."[27] This is because the framework used to prepare the NODA was developed for use in considering static, standalone appliances. As Mr. Shorey explained, appliances such as refrigerators typically operate under stable operating conditions, perform a single function, rarely change, and remain static in the consumer's house over its long lifetime. Thus, "[i]t can be analyzed with a limited number of models, projected and counted."[28] By contrast, he noted that "Set-top boxes are elements of complex systems providing programming and information services that change dynamically with changes in software, changes in the network, and changes in network services," and thus are "totally unlike appliances for which the regulatory system was developed."[29]

The NODA is also inaccurate in many of its fundamentals. As the representative from DirecTV stated at the Commission's workshop, "something that we should all keep in mind regarding the NODA, which is don't confuse detail with accuracy or correctness."[30] He indicated that the NODA had evaluated three types of set-top boxes used by DirecTV, and that, in each case, its analysis was seriously flawed: it assumed that DirecTV could transition to a 2.5 inch storage drive that does not meet the company's performance requirements, and it set aspirational long-term targets that in one case was higher than a set-top box that DirecTV is already using, and in another case was for a type of set-top box that DirecTV already considered to be obsolete. DirecTV thus told the Commission that the NODA lacked "a sense of how quickly the industry moves, and just how assumptions can be obsolete very quickly,"[31] and that "it's not annotated well enough to understand exactly what technologies are underlying some of the cost increments that went into it."[32]The NODA, as well as other outdated or unscientific reports,[33] therefore are not reliable starting points or bases for any Commission regulation.

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[27]Everett Shorey, *Analyzing Potential Impacts of Energy Efficiency Standards for Set-top Boxes, Report to the Consumer Electronics Association and National Cable & Telecommunications Association*, Shorey Consulting, Inc. at 3 (June 2013).

[28]*Id.* at 2.

[29]*Id.*

[30]Transcript of Staff Workshop, 2012-2013 Appliance Efficiency Rulemaking (May 29, 2013) at 148.

[31]*Id*. at 152.

[32]*Id*. at 151.

[33]For example, NRDC continues to invoke its 2011 report, even though, as we have previously demonstrated, it touted inaccurate data and was based in part on incorrect assumptions. *See, e.g.*, NRDC May 9, 2013 Comments at 1 (citing 2011 study regarding set-top box energy usage). The report claimed that set-top boxes in the typical home consume more than the standard ENERGY STAR refrigerator. In fact, NRDC's estimate was not based on typical cable households. Even the 21 cubic foot refrigerator referenced in the NRDC report consumes 1.5 times the amount of energy consumed by the HD-DVR

5. Other Regulatory or Legislative Considerations: Regulation of Cable Set-Top Boxes is Unwarranted Under the Warren-Alquist Act (Template Section 12)

As we have previously explained, Commission regulation of cable set-top boxes is unwarranted and unnecessary under the standards of the Warren-Alquist Act.

The Commission is required to consider alternative approaches before it can impose any regulations, and the Voluntary Agreement is already implementing a comprehensive energy conservation program that, as noted above, will deliver even more energy savings than were sought by advocates of regulation at the outset of this proceeding, in a manner that will deliver better products and services to consumers.[34]

The Warren-Alquist Act also requires the Commission to consider the impact on "product efficacy for the consumer" that would result from contemplated regulations. If the Commission applies its framework for relatively static, standalone appliances to fast-changing set-top boxes, it will end up with energy caps set for yesterday's services. New consumer services would be put on hold while the Commission considered rule changes or waivers to accommodate delivery of those new services. Innovation, consumer choice and competition would be stifled as manufacturers and MVPDs would remain handcuffed to outdated rules that, by the nature of the regulatory process, cannot quickly be changed. In contrast, the Voluntary Agreement model can adapt to changes in technology and the market much more quickly and nimbly than regulations. This will enable service providers to develop energy efficiency techniques that do not impede innovation and competition and that preserve or enhance the customer experience so that consumers do not reject them.[35]

Under the Warren-Alquist Act, all "standards shall be drawn so that they do not result in any added total costs for consumers over the designed life of the appliances concerned." The Warren-Alquist Act also requires the Commission to undertake a cost-benefit analysis prior to adoption of any energy standard. Thus, the Commission must consider not only the increased price for set-top boxes that would be caused by regulation, but also the substantial costs that regulation would impose on MVPD networks, which ultimately would be borne by consumers.[36] Because set-top boxes operate as components of networks and the services they

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referenced in the report, and current model HD-DVRs are far more efficient than portrayed in the NRDC report. A standard ENERGY STAR refrigerator consumes 2.5 times the amount of energy consumed by a current model DVR, and set-top boxes have been increasing in energy efficiency far more rapidly than refrigerators. *See* CCTA/NCTA May 9, 2013 Comments at 20-21, 33-34 (debunking portions of the NRDC report) and Exhibit 1.

[34]*See supra* n. 16.

[35]*See* CCTA/NCTA May 9, 2013 Comments at 27-28.

[36]*Id.* at 14-16.

deliver, the costs of redesigning set-top boxes are not captured solely by studying set-top box components, and instead include the costs of the overall impact on networks, services, and content protection functionality that protects consumers' access to high-value content.[37] These potential costs are great in comparison to the incremental savings—if any—that might be obtained above and beyond those secured by the Voluntary Agreement.[38]

For all of these reasons, the Warren-Alquist Act does not support Commission regulation of cable set-top boxes.

Conclusion

Commission regulation of cable set-top boxes would be preempted by federal law and is unwarranted and unnecessary under the Warren-Alquist Act. The Voluntary Agreement is already securing the energy savings sought by the IOUs at the inception of the Commission's current investigation. The Voluntary Agreement can adapt quickly and flexibly to changes in technology and the market to seize new opportunities for energy efficiency, while avoiding the many risks of state government intervention: erosion of the consumer benefits from rapid innovation, reduction in the efficacy of video devices and services, suppression of new services and competition, and fractured and inconsistent state rules that hobble the continued development of an efficient market for set-top boxes. CCTA and NCTA therefore propose that the Commission close this proceeding with respect to cable set-top boxes and other subscriber equipment used in cable systems.

[37] *Id.* at 31-32.

[38] *Id.* at 19-23, 33-37.

Exhibit 1

Summary of the Benefits of the Voluntary Agreement

SET-TOP BOX ENERGY EFFICIENCY

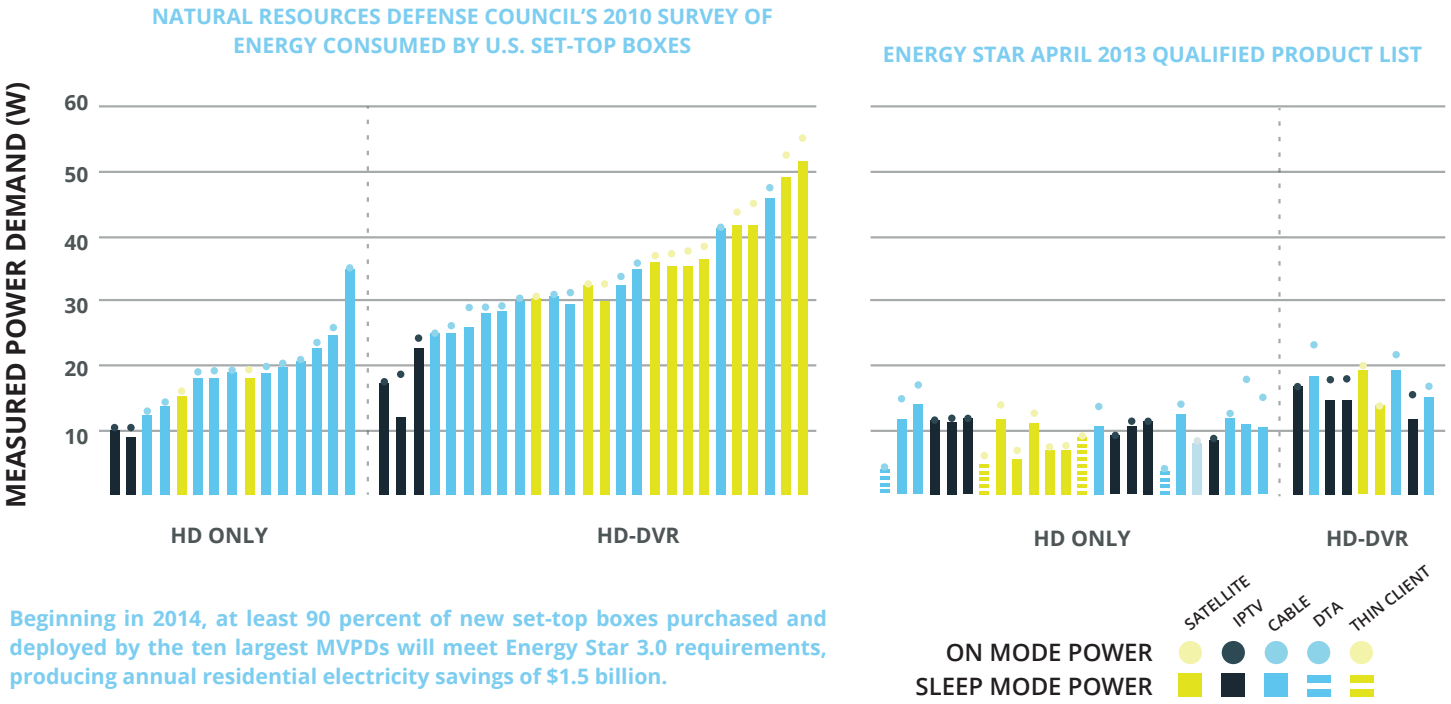
In December 2012, 15 industry-leading multichannel video programming distributors (MVPDs) and equipment manufacturers launched an unprecedented Set-Top Box Energy Conservation Agreement covering over 90 million American households that will result in $1.5 billion in annual residential electricity savings and reduce carbon emissions by the equivalent of four power plants each year. Beginning in 2014, at least 90 percent of the new set-top boxes purchased and deployed by the participating companies will meet the Environmental Protection Agency's ENERGY STAR 3.0 (ESv3) efficiency levels, enabling significant energy savings that will occur years before any regulatory approaches could take effect.

In addition to deploying the ESv3 set-top boxes, the agreement also includes:

- New technology that will enable set-top boxes to run at reduced power levels when the TV is off, while keeping them connected for essential network operations and updates;
- Many different and creative approaches to delivering energy efficiency to the entire home;
- Ongoing research and development through a dedicated Energy Lab;
- Regular industry meetings to keep updating energy efficiency measures as technology improves and in consultation with government agencies and energy efficiency advocates.

Counterpart agreements in Europe and Australia have demonstrated that industry-initiated agreements have become an internationally-approved approach for delivering energy efficiency measures that work on complex and competitive MVPD networks.

NRDC DATA DOES NOT REFLECT ENERGY IMPROVEMENTS



Beginning in 2014, at least 90 percent of new set-top boxes purchased and deployed by the ten largest MVPDs will meet Energy Star 3.0 requirements, producing annual residential electricity savings of $1.5 billion.

THE SET-TOP BOX ENERGY CONSERVATION AGREEMENT RECEIVED STRONG BIPARTISAN PRAISE:

- "I would like to congratulate the 15 companies that joined today's agreement, which will save consumers billions of dollars in reduced electricity bills." - Sen. Dianne Feinstein
- "I commend the industry for proactively developing a consensus agreement that will save their customers money, and not waiting for a federal mandate that forces them to act... This agreement is a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market." - Sen. Lisa Murkowski
- "This strong industry-led efficiency agreement can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements." - Rep. Ed Markey
- "The cable industry is to be commended on this forward thinking to adopt practices that can take effect now and drastically improve efficiency moving forward." - Rep. John Dingell

DOING MORE WITH LESS

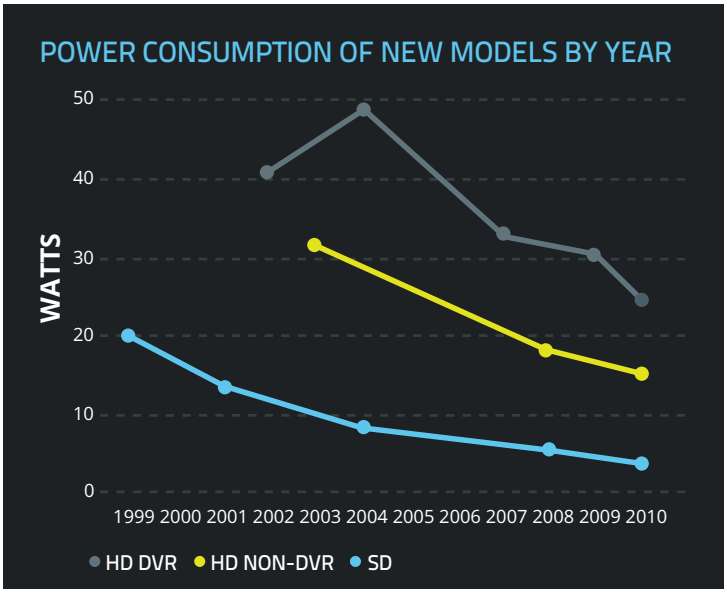
THESE ARE NOT YESTERDAY'S SET-TOP BOXES

Set-top boxes have shown steady gains in energy efficiency. Today's DVRs use half the energy they used when they were first introduced in 2002, and the efficiency gains are continuing.

Set-top boxes initially offered descrambling and simple channel-changing functions, but in recent years, they have evolved into very sophisticated devices. Today's set-top boxes include new and innovative features to meet consumer demands:

- High-Definition resolution;
- Multiple tuners to allow simultaneous watching and recording of different channels;
- On-demand, digital video recording and increased storage capacity for storing shows;
- More processing power and memory for advanced applications, including multi-room playback of recordings from the main DVR;
- Home networking to connect other set-top boxes and customer-owned devices;
- Remote programming of recordings from mobile phones;
- Incorporating social networking into the TV experience.

Efforts are also underway to make the set-top box a hub for home energy management, home security or home automation.



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SET-TOP BOXES NOW OFFER FAR MORE SOPHISTICATED FEATURES AND FUNCTIONS, YET KEEP GAINING IN ENERGY EFFICIENCY

2002 - DCT2000

- SINGLE TUNER (UP TO 860 MHZ)
- SD VIDEO
- VOD
- COMPOSITE AND S-VIDEO OUTPUTS (NO DVR)
- **219.2 KWH/YEAR**

2006 - DCT6416

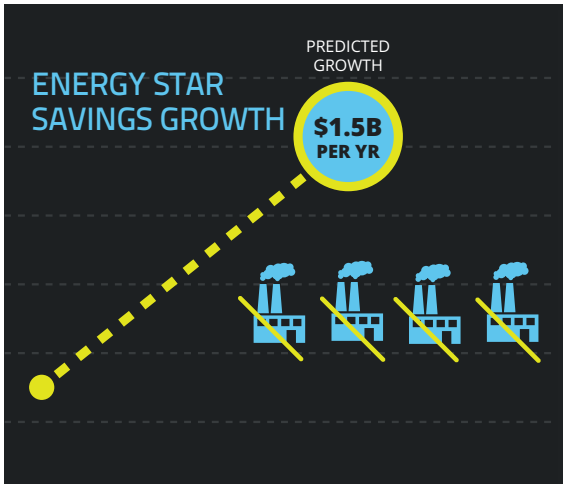
- DUAL TUNER (UP TO 860 MHZ)
- SD AND HD VIDEO (UP TO 1080I)
- VOD
- 160 GB HARD DRIVE DVR
- DOCSIS EMBEDDED CABLE MODEM
- COMPONENT AND HDMI OUTPUT
- MORE MEMORY AND SOPHISTICATED GRAPHICS FOR INTERACTIVE APPLICATIONS
- **395.6 KWH/YEAR**

2013 - DCX3501

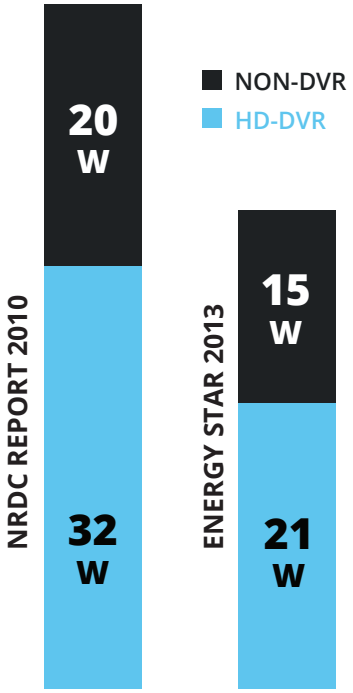
- DUAL TUNER (UP TO 1 GHZ)
- SD AND HD VIDEO (UP TO 1080P)
- 3D VIDEO
- MULTI-ROOM DVR SUPPORT
- 500 GB HARD DRIVE DVR
- EVEN MORE MEMORY AND SOPHISTICATED GRAPHICS FOR INTERACTIVE APPLICATIONS SUCH AS REMOTE MANAGEMENT OF DVR, REMOTE CONTROL FROM TABLET APP, CALLER ID, T-COMMERCE AND OTHER INTERACTIVE APPLICATIONS
- **170 KWH/YEAR**

As video providers innovate and compete to serve the many devices in today's homes, they have developed many different and innovative energy-efficient approaches:

- Using whole-home devices and home networks to enable other devices to play, pause, fast-forward and rewind recorded content stored on the main DVR;
- Moving the DVR itself back into the network, where energy can be efficiently managed on a shared basis;
- Moving the program guide into the cloud, so that it can be viewed in the home but need not be stored on a device at home;
- Using small digital transport adaptors that run on four watts of power instead of much higher-powered set-top boxes, saving two billion kWh annually;
- Delivering service in IP directly to iPads, Android tablets, Rokus, and other customer-owned devices.

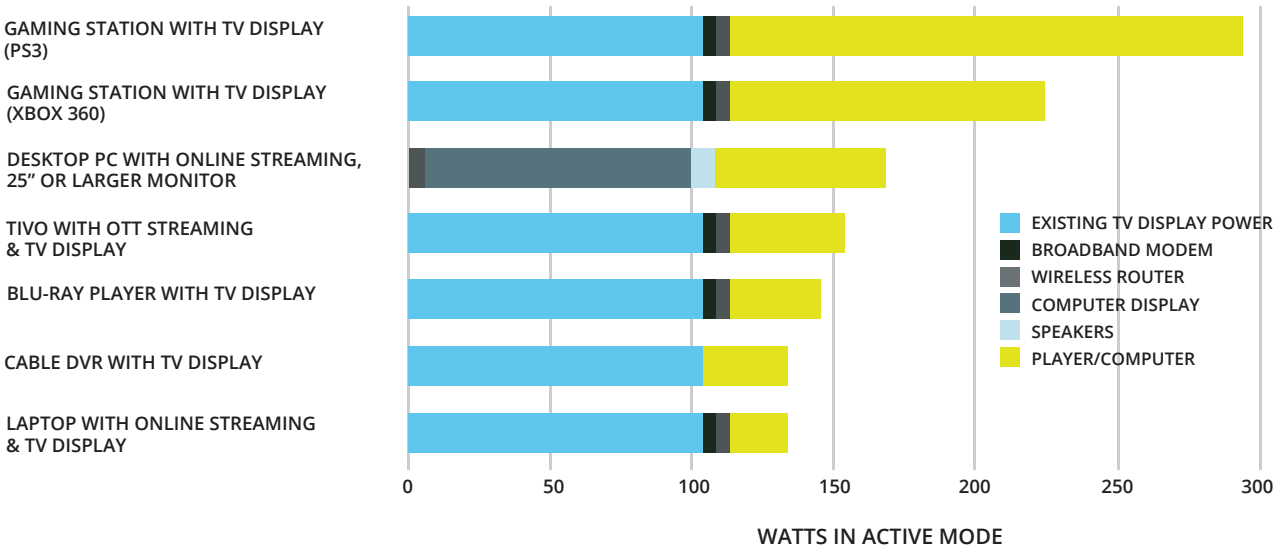


SET-TOP BOX EFFICIENCY INCREASES WITH EACH GENERATION



A 2013 home with one ESv3 DVR and a second ESv3 non-DVR is dramatically more energy efficient than in 2010.

ENERGY CONSUMPTION IN ACTIVE MODE

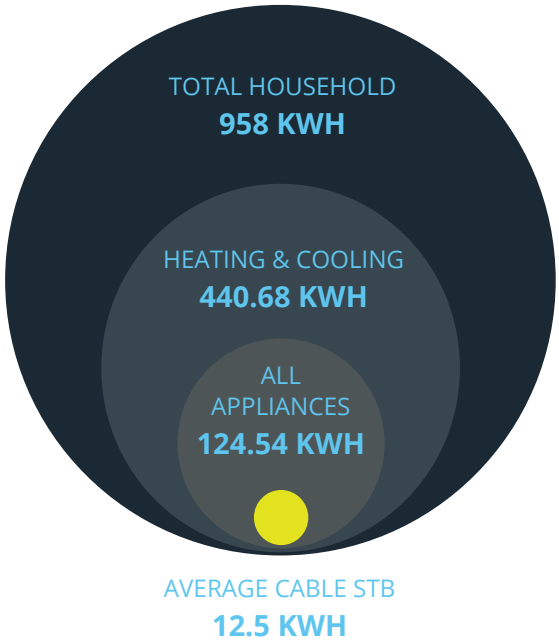


SET-TOP BOXES ARE LIGHT ENERGY USERS

MVPDs are continuing to improve their set-top boxes and to make their services available through a wide variety of other consumer-owned devices, including personal computers, gaming stations, and retail video devices. When compared to other video devices, set-top boxes are highly efficient for distributing video and compare quite favorably to the many other systems. Taking into consideration all of the components with which other video devices must be paired to stream video, many consume more energy than a typical set-top box.

Nonetheless, MVPDs are committed to energy efficiency, but set-top boxes are a small part of the overall challenge. The total energy use by set-top boxes is dwarfed by almost every other plugged-in device in the home, such as heating, air conditioning, and appliances; and according to the U.S. Energy Information Administration, electricity use by other household electrical devices is growing far more rapidly than use of set-top boxes.

HOUSEHOLD ENERGY USAGE PER MONTH



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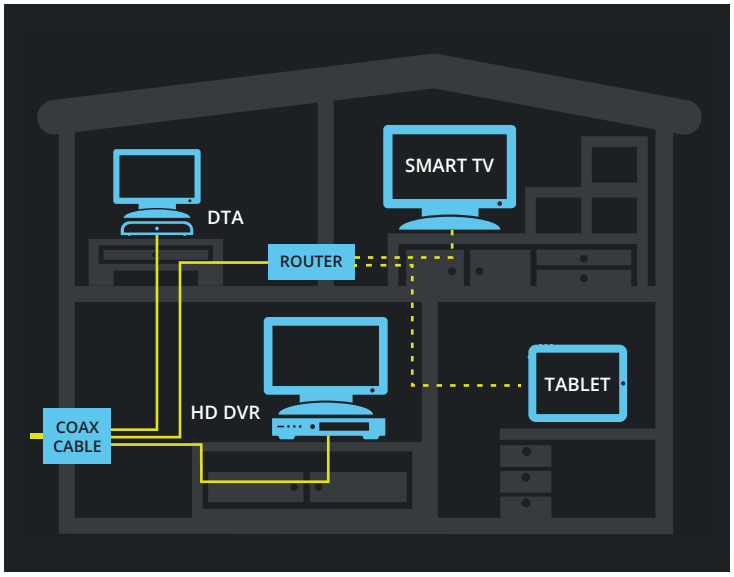
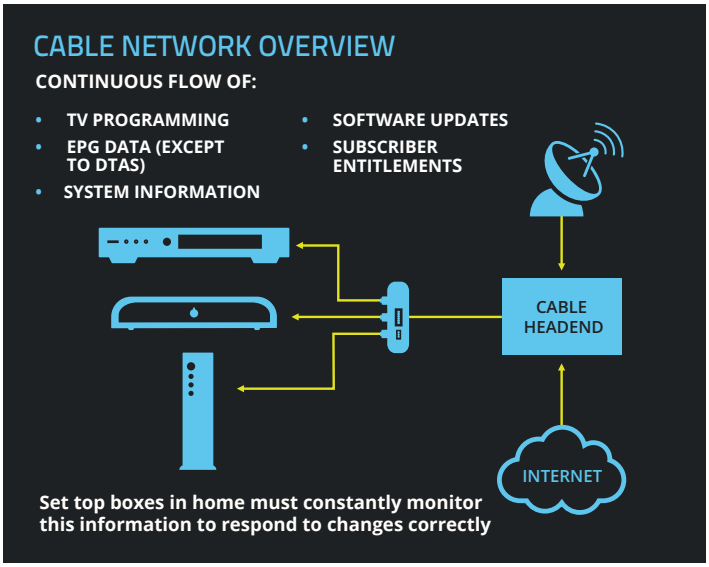
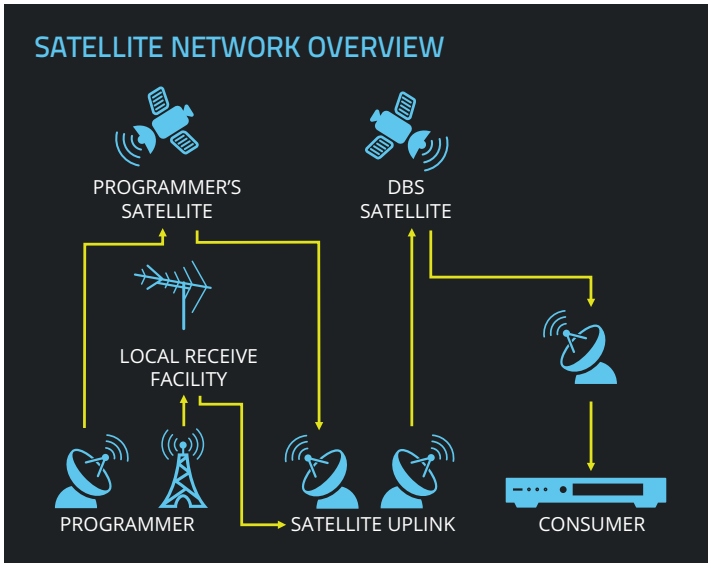
WORKING WHEN YOU AREN'T WATCHING



Your set-top box is working when you aren't looking so that TV is ready for viewing when you are. Behind the scenes, set-top boxes are operating as one part of complex distribution networks which vary depending on which MVPD you have, where you live and services to which you subscribe. In most cable and satellite systems, the box is never completely shut down because the network is constantly delivering software updates to fix reported bugs, add new features and functions, and provide current navigation information (such as changes in channel location). In addition, the program guide built into the box is receiving the latest programming schedules and descriptions, and the network is delivering security keys (protecting the video and other premium services) and sending and receiving other data for diagnostics, so that your service remains uninterrupted.

But we are inventing new ways to sleep. Even though set-top boxes need to stay connected to the network, MVPDs are finding ways to keep them operating at reduced power levels while still keeping them live on the network. The cable industry is downloading "light sleep" software to compatible DVRs that are already in the home, gaining more than 20 percent energy savings by turning off the DVR hard disk when it is not in use. More than 10 million are operating now, saving $50 million annually in residential power. Satellite and other providers are providing "automatic power down" features that reduce box activity when there has been no user interaction for hours. The cable industry is working on next generation set-top boxes with chips that adjust their power to save even more energy while staying connected to the network. The cable industry is committed to field-test such units in 2014 and deploy them if successful.





ENERGY EFFICIENCY IS WIN-WIN FOR CONSUMERS AND PROVIDERS

Set-top boxes that offer more features and services require increased processing power and memory, but today's competitive environment demands that they be energy efficient. MVPDs own and maintain tens of millions of devices in consumer homes and if these devices fail, customers are upset, service calls are required and truck rolls could be needed. Lower power consumption generally means less heat and lower operating temperatures for devices, which can increase reliability, reduce service calls, and improve performance and device longevity.

MVPDs also support efforts to reduce the overall set-top box component count by integrating several features into one computer chip, called "systems on a chip." The new generation of chips require lower energy consumption but provide increased processing horsepower to run better applications and user interfaces.

Lower power usage is well aligned with MVPD business incentives: lower total cost of ownership (including purchase, maintenance and repair), fewer trouble calls and better performance in a competitive marketplace.

VOLUNTARY AGREEMENT PARTICIPANTS

COMCAST
at&t
DIRECTV
bright house NETWORKS
dish
CenturyLink™
TIME WARNER CABLE
CISCO
COX
MOTOROLA
verizon
ECHOSTAR
Charter
ARRIS
CABLEVISION

WHY A VOLUNTARY APPROACH?

Through the Set-Top Box Energy Conservation Agreement, the participating companies are effectively and rapidly increasing energy efficiency for more than 90 percent of MVPD consumers and changing the entire set-top box energy footprint in the United States years before any regulatory approaches could take effect, which the Department of Energy has acknowledged would be in 2018 at the earliest. To create accountability and support transparency, the companies have adopted processes for verification of set-top box performance in the field, annual public reporting on energy efficiency improvements, and posting of power consumption information for customers.

Research and development for next generation cable set-top boxes with an even more reduced power consumption mode is well underway and a dedicated Energy Lab has been established for these complex efforts.

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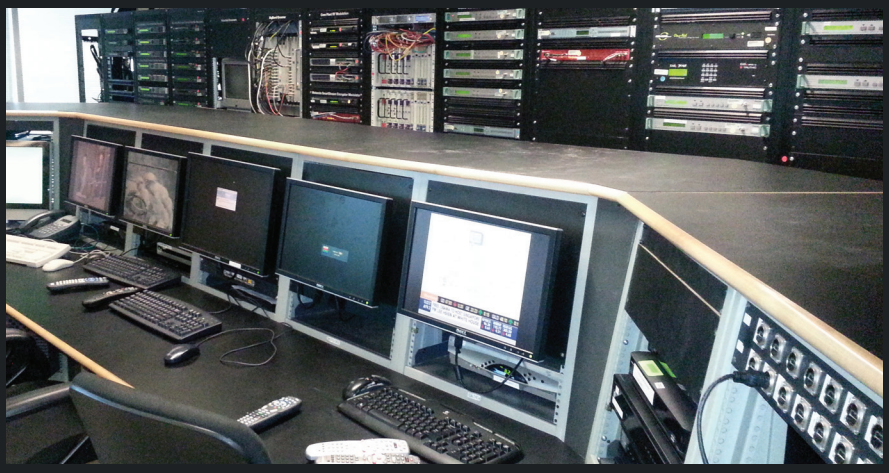
A voluntary market solution is especially appropriate for set-top boxes:

- Most set-top boxes are provided by MVPDs as part of services and are integrated into their networks. MVPDs can effectively make energy efficiency the norm through their purchasing and operations.
- U.S. policy strongly prefers voluntary, market solutions, as Congress and the Administration have mandated in the National Technology Transfer and Advancement Act (NTTAA), OMB Circular A-119, and a series of Executive Orders through 2012. The diversity and flexibility invited by such a voluntary approach drive innovation and help to promote U.S. leadership and competitiveness.
- Voluntary, flexible development is critical if energy efficiency measures are to work with sophisticated boxes and complex video networks and services. If energy efficiency measures do not enhance the customer experience, consumers will reject them.



CABLELABS® - ENERGY LAB

The R&D consortium that brought you DOCSIS cable modems:

- Has created a unique testing and development facility for designers of energy efficient set-top software and hardware.
- Is building an energy tracking program for set-top boxes.
- Is engaged with cable operators, chip, guide, software, hardware, conditional access and security experts in energy efficiency work for next generation set-top boxes that can operate at reduced power but still be ready for viewing when you are.

REGULATIONS OFTEN BACKFIRE.

The FCC rule that requires leased cable set-top boxes to include CableCARDs wastes more than 500 million kWh per year.

- A "one size fits all" regulatory approach will impede the innovation and competition which have long characterized the multichannel video industry. Regulations often backfire: the FCC rule that requires leased cable set-top boxes to include CableCARDs wastes more than 500 million kWh per year. Under a voluntary approach, consumers receive lower electricity bills and rapid innovation.

Exhibit 2

Analyzing Potential Impacts of Energy Efficiency Standards for Set-top Boxes

Analyzing Potential Impacts of Energy Efficiency Standards for Set-top Boxes
June 2013

A Report to:
Consumer Electronics Association
National Cable & Telecommunications Association

Prepared by:
Everett Shorey
Shorey Consulting, Inc.

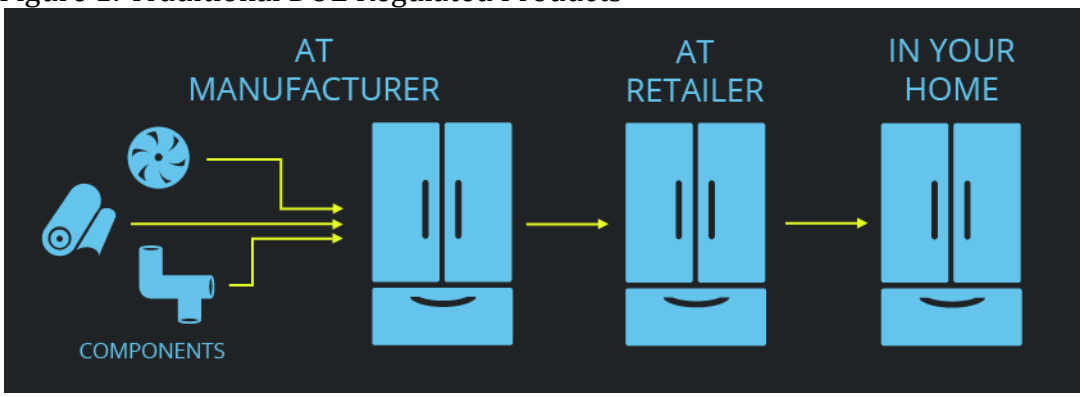
Analyzing Potential Impacts of Energy Efficiency Standards for Set-top Boxes
June 2013

EXECUTIVE SUMMARY

The US Department of Energy (DOE) is considering efficiency standards for set-top boxes used in cable, satellite and other television systems. However, the analytical approaches and models traditionally used by DOE do not apply to multichannel video services and the associated Multichannel Video Programming Distributors (MVPDs). It will not be possible to evaluate standards with respect to the factors required by statute in any meaningful way using DOE's current models and approaches. At its core, DOE's traditional concepts are based around static physical objects, such as a refrigerator, and not around dynamic reconfigurable networks.

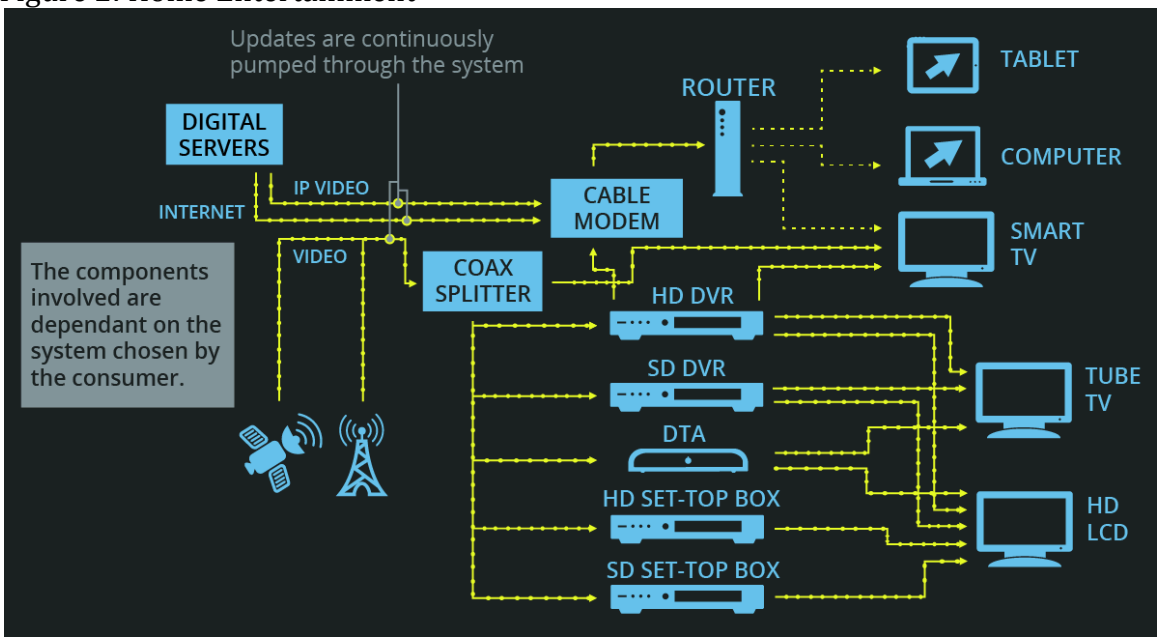
A refrigerator is a single, standalone, static object that consumers own, rarely replace; one that operates under stable operating conditions (Figure 1). It performs basically one function, design changes are infrequent, and it remains static in the consumer's house over its long lifetime. It can be analyzed with a limited number of models, projected and counted.

Figure 1: Traditional DOE Regulated Products



Home entertainment is an evolving service delivered by rapidly changing networks, equipment, software, programming and other services, all of which operate as integrated components for delivering those services. This situation is totally unlike appliances for which the regulatory system was developed. Set-top boxes are elements of complex systems providing programming and information services that change dynamically with changes in software, changes in the network, and changes in network services (Figure 2).

Figure 2: Home Entertainment



Set-top boxes have a short lifetime, are bundled and modified with changing service subscriptions and are returned to the service provider/owner when subscribers change services or service provider, or when the service provider upgrades its delivery infrastructure. Set-top boxes operate as highly specialized and variable components adjusted to each specialized MVPD network and service offering. Components of the network are reconfigurable in the field so their function and use change over time. Changes in one component affect all other components, and not just the cost of set-top box production. Set-top boxes change rapidly as services and market competition changes, making it impossible to develop meaningful projections within the DOE analytical process.

Efficiency standards of the type traditionally developed by DOE apply to static "*things*" that can be touched and measured. The home entertainment network cannot. While there are *things* involved, such as set-top boxes, servers, television sets, those *things* are changing rapidly. It is not possible to project how the network will evolve, what *things* will be in use, how those *things* will be configured and how consumers will use them. The DOE regulatory and analytical structure is fatally flawed with respect to home entertainment and can neither be used nor adapted to be used for set-top boxes.

I. SITUATION

The US Department of Energy (DOE) is considering whether and how to set minimum energy efficiency standards for set-top boxes used in cable and satellite television systems[1]. By statute[2], DOE is required to consider seven factors when deciding whether and how to establish energy conservation standards and it has developed a series of models and/or analytic tools to support its consideration of those factors[3]:

EPCA Factors	DOE Analysis
1. Economic impact on consumers and manufacturers	Life-Cycle Cost Analysis Manufacturer Impact Analysis
2. Lifetime operating cost savings compared to increased cost for the product	Life-Cycle Cost Analysis
3. Total projected energy savings	National Impact Analysis
4. Impact on utility or performance	Engineering Analysis Screening Analysis
5. Impact of any lessening of competition	Manufacturer Impact Analysis
6. Need for national energy conservation	National Impact Analysis
7. Other factors the Secretary considers relevant	Environmental Assessment Utility Impact Analysis Employment Impact Analysis

The Life-Cycle Cost Analysis, Manufacturer Impact Analysis and the National Impact Analysis depend upon inputs from the Engineering Analysis, Life-Cycle Cost Analysis, Government Regulatory Impact Model (GRIM), and National Impact Analysis spreadsheet models. DOE is proposing to use these models in its consideration of the *EPCA Factors* for set-top boxes. However, these models and their intellectual underpinnings were built around household appliances such as washing machines and refrigerators. Neither the models themselves nor the fundamental concepts of the *DOE Analysis* approaches are appropriate for assessing set-top boxes.

[1] Docket # EERE–2010–BT–NOA-0067

[2] 42 U.S.C. 6295(o)(2)(B)(i)

[3] Slide 17, 2012-01-26 Framework Meeting Presentation Slides, January 26, 2012, EERE-2011-BT-NOA-0067

II. CONCEPTS UNDERLYING STANDARD DOE APPROACH

A. The DOE Analysis was designed for standalone, static hardware appliances that operate under stable operating conditions

The basic underpinning of the standard DOE approach was developed for home appliances and similar products. This can be understood by thinking about a typical home appliance, such as a refrigerator. First, there is a physical object (i.e. the refrigerator) with definable components that affect energy use (e.g., insulation thickness, compressor efficiency, etc.). The refrigerator is ultimately sold to a user who will own and operate the refrigerator, essentially unchanged, for the refrigerator's lifetime. This situation remains static for some reasonably long period of time.

B. The DOE Analysis was designed for long-lived appliances that consumers own and rarely replace.

The standard DOE approach is also premised on relatively infrequent design changes in home appliances and similar products. The cost of changing the design of a refrigerator is substantial relative to the cost of the refrigerator, so manufacturers change designs infrequently. The cost of the refrigerator to the consumer is also high, so the consumer rarely replaces the refrigerator before the end of its useful life. Again, each element of this situation remains static for some reasonably long period of time.

C. The DOE Analysis was designed for products with relatively few variables that, if changed, would directly affect only hardware production costs.

The DOE modeling process flows from this situation of defined objects and static conditions. Even though the absolute numbers of products and consumers are large, the actual variations are relatively few. The number of design options for changing energy consumption is limited. The number of different product variations (i. e. refrigerator models) is constrained by manufacturing requirements. The most recent refrigerator National Impact Analysis covered 12 refrigerator types with 5-6 design options each for fewer than seventy-five situations.[4] The anticipated life of a refrigerator is over 15 years and standards are anticipated only every 7 years, allowing a lengthy period where the projected designs will be in place. The differences in distinctly different consumer use patterns are also limited. As a result, the situation is both countable and projectable.

[4] 2011-03-16 National Impact Analysis Spreadsheet: Refrigerator-Freezers from EERE-2008-BT-STD-0012

D. The DOE Analysis was designed for products in which design changes are infrequent and predictions could be relatively reliable.

From these basic underpinnings, DOE models can count and project within certain constrained cases developed for appliances and the appliance market. The models analyze example cases (a refrigerator of a defined size used in a certain fashion in a geographic area with a specified cost of energy and expected to last for a period of years). The models then calculate the economics to consumers of that case (the Life Cycle Cost Analysis) and add up all of the various options to estimate the total effects (the National Impact Analysis). The Government Regulatory Impact Model (GRIM) performs a similar function for manufacturers. The GRIM defines a specific set of cost assumptions and adds up the aggregate change in industry cash flows. There have, of course, been refinements to the models over time to account for certain types of variations (such as the expected lifetime of a product), which are then covered through probability analyses. But the core assumption of stable objects and situations remains intact, and that assumption serves an essential prerequisite for the model to work.

Because of the relative stability of appliances, it is possible to make reasonable determinations of consumer economics and to estimate national impacts. The economic situation for consumers can be calculated around a limited set of refrigerator design options and standardized conditions of use (i. e. hours of operation) leading to an estimate of payback periods for lower energy use. The national situation is an aggregation of energy and consumer savings from the various design options. There are specific things to count in a manageable number of variations. The actual mathematics of calculating the energy and economic effects can become intricate, but the essential situation is quite straightforward and manageable. In the case of a refrigerator, 12 refrigerator types with 5-6 design options and changes expected only after 7 years, the DOE models count seventy or so scenarios for multiple years.

III. SYSTEM REQUIREMENTS ON SET-TOP BOXES

A. Set-top boxes are elements of complex systems providing programming and information services that change dynamically with changes in software, changes in the network, and changes in network services

None of the fundamental assumptions underlying the DOE modeling process apply in the case of set-top boxes. A refrigerator stands alone – it sits in the kitchen and keeps things cold – for a long period of time. While the set-top box is a physical object, it is not standalone, static piece of hardware with stable operating conditions. Instead, the set-top box is a component part of a system or network that provides entertainment, programming, and information services to the home. It operates as part of a system that changes dynamically with changes in software, changes in the network, and changes in network services. Even as a device, the set-top box is the product of multiple vendors – of hardware, firmware, middleware,

guides, on-demand services and other applications – many elements of which continue to change over the life of the device. As the system changes, so does the role and functionality of the set-top box and where, when and how electricity is used in providing the home with programming and information services.

B. Set-top boxes have a short lifetime, are bundled and modified with changing service subscriptions and are returned to the service provider/owner as subscribers change services or service provider

A cable, satellite, or telephone multichannel video programming service accomplishes six principal functions:

1. It acquires and aggregates content and information services for retail service offerings. Content and services change during the service period.

2. It deploys, maintains and changes its distribution network as services evolve.

3. It encodes and protects content for distribution to subscribers who subscribe to a variety of retail offerings.

4. It delivers and decodes authorized content for presentation at the subscriber premises. This may also include recording of programming for later subscriber playback, and transcribing, re-encoding, or otherwise processing content for distribution to additional devices.

5. It uses one or more home networking and other technologies to distribute content to additional devices (typically in the home).

6. It enables the display of content.

The multichannel video program distributor (MVPD) conventionally performs the first four functions and may perform the fifth. Subscribers conventionally own their own television sets for the sixth function: display. Although the set-top box is often a component in delivering these services, the subscriber purchases this package of functionalities, not a specific piece of hardware. In fact, the set-top box is frequently bundled with the monthly service rate for the MVPD subscription service. Almost all set-top boxes are leased, rather than owned, as part of this service. In sharp contrast to appliances that are rarely replaced over a long lifetime, set-top boxes are frequently returned to the MVPD as customers change services, order additional features, or change residence or service provider.

C. Set-top boxes operate as highly specialized and variable components adjusted to each specialized MVPD network and service offering. Changes in one component of the network affect all other components, and not just the cost or performance of set-top boxes.

Set-top boxes do not operate as individual products but as integrated parts of very specialized MVPD networks and services. They are components of a complex network of electronics, software, and distribution infrastructure that varies not just from provider to provider, but often from local cable system to local cable system owned by a single MVPD. There are more than 1100 cable operators operating more than 7000 headends. Though six cable operators now provide service to approximately 85% of cable subscribers, they operate systems with often substantial diversity in their networks and with different set-top box configurations. For example, cable operators have chosen different video-on-demand approaches and vendors. Some operators have deployed switched digital video, which delivers certain channels only when consumers tune them, while others have not. While these cable systems share some common features, such as MPEG-2 compression and QAM modulation, they have many more distinct proprietary elements: different conditional access, out-of-band communications channels used for command and control of the set-top box, operating system (OS) and processor instruction sets, network control architecture in support of interactivity, and electronic program guide applications and guide metadata formats.

There is not only substantial variation among these six operators, but also within their companies as well. Due to consolidation in the cable industry, there is considerable variation among systems owned by the same company. Cable operators that were once among the ten largest – TCI, MediaOne, Adelphia, Century and Marcus – have been acquired (sometimes in parts) by other operators, leaving the owners today with a wide variety of system architectures and technologies within single companies. Today's cable systems thus encompass "a set of legacy digital video delivery systems that have a huge installed base of tens of millions of digital cable set top boxes," and system technology that "spans over a decade of technology advances resulting in a broad range of set-top capability and performance. "[5] Variation is even greater when other types of video service providers are considered. Four of the eight largest MVPDs are telephone companies and DBS providers, with varying implementations. Verizon's FiOS is very different from the IPTV network of AT&T and CenturyLink, and DISH and DIRECTV operate satellite systems that are very different from one another. And each of these separate ecosystems is far from static. System architectures and networks are constantly in flux.

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[5] Ralph W. Brown, *Tackling the US Cable Set-top Legacy: Middleware in a Sea of Proprietary Systems* at 1.

Among appliances for which the DOE model was developed, there are few variables in commodities—for example, 12 refrigerator types with 5-6 design options each, a 15-year anticipated life, and infrequent changes in production that affect only production costs. With set-top boxes, there are a high number of variables, a large number of models, frequent changes and a change in hardware affects not only set-top box production but also the network and services supported. The number of variations cannot be analyzed, assessed or counted in any reasonable process.

D. Set-top boxes change rapidly as services and market competition changes, making it impossible to make meaningful projections within the DOE appliance model

As component parts of MVPD services, set-top boxes change rapidly as services change. Set-top boxes initially just offered an expanded channel tuning range, a remote control, or descrambling of secured and optional channels. Set-top boxes have added new and innovative features to meet new consumer demands: HD resolution; simultaneous watching and recording of different channels; on-demand movies; digital video recording capability, and then more and more storage capacity for all those recorded shows; more advanced applications and more processing power and memory to run them. They have evolved also to support other devices, with multi-room playback of recorded shows on the main DVR, and home networking to other set-top boxes in the home, and to devices that travel with subscribers. They are now incorporating social networking into the viewing experience, and efforts are now underway to make the set-top box a hub for home energy management, home security or home automation. Competing service providers deliver their services in different ways. One MVPD has moved the DVR itself back into the network; another uses the primary set-top box to "sling" recorded content to additional, remote devices. Many MVPDs are delivering service using Internet Protocol (IP) directly to iPads, Android tablets, Roku devices, and other customer-owned devices.

Among appliances for which the DOE model was developed, design changes were infrequent. With set-top boxes, the only certainty is that designs will change rapidly. The means for performing each of the six functions performed by MVPDs, the technologies in use, and the location and type of hardware involved are virtually certain to continue to evolve at a rapid rate. For example, where storage takes place is a matter of system design, not an inherent characteristic of the service. How content is encoded, transmitted decoded and distributed changed as systems have moved from analog to digital, from Standard Definition to HD programming, from DVRs to network DVRs and home networking. The system, service, and set-top boxes will continue to evolve with ultra-HD, IP delivery or IP transcoding, and cloud delivery to tablets or other non-traditional displays. The very nature of service delivery may change with the evolution of streaming video from broadcaster websites, YouTube, and "over-the-top" (OTT) video service providers like Netflix and Hulu. The nature of the home entertainment service is in flux, and the role and

physical structure of a "set-top box" has continued to evolve so as to adapt to these changes in technology.

It is impossible for DOE models to project how the future of home entertainment will continue to evolve. History shows that home entertainment can and does take unpredictable paths. For example, over the past five years home entertainment has incorporated:

- The emergence of consumers watching programs on tablet computers, such as the iPad, using streaming video over home wireless networks. The emergence and growth of tablets was completely unpredicted prior to Apple's introduction of the iPad in 2010.

- The advent of TV Everywhere services to computers where the computer has replaced the television set and the Internet is the distribution network. In the early 2000s, the efforts and expectations were for computer functions to migrate to the television, not the reverse.

- The decline of "appointment viewing" of television programming where consumers watched programming as a set time. Increasingly, consumers store programming to watch at their convenience. The approaches consumers take to manage time shifting are still evolving.

- The introduction of products like AppleTV and GoogleTV to support OTT IP video services to the home by players that are traditionally not considered MVPDs.

- The potential for viewing of audio/video content on alternative platforms such as gaming devices.

Each of these changes was either unforeseen or lost in the sea of other alternative futures that did not occur. There is no reason to believe that the future from today onwards will be more predictable than the past several years. Attempting to predict which of a virtually infinite set of future situations will emerge is an impossible task. Trying to do so in order to add an appearance of rigor or accuracy to a set of projections obscures, but does not eliminate, the inherent unpredictability of the situation, providing a veneer of accuracy where none exists.

The only likely constant in this process is the requirement to change and adapt. The likelihood that the functionality and design of a set-top box being deployed a year or two from now will be what is in a box today is approaching zero unless artificially constrained by regulation. Even then, non-regulated systems may encroach in the regulated arena and entirely alter the market.

IV. IMPLICATIONS FOR THE USE OF DOE'S TRADITIONAL MODELS

The actual in-use situation for home entertainment and the corresponding outlook for on-premises hardware (the set-top box or alternatives) could hardly be more different from that of a static home appliance. There is no physical object with stable operating characteristics. There is no stable operating environment from which to project electricity usage. There is a continually evolving "product" with the potential for thousands of variations depending on the overall system choices of the MVPDs and on the need to adapt to the thousands of legacy system combinations of technologies in place across the country. The variations and options are, for all practical purposes, uncountable and are unstable. A modeling process based on counting stable objects is, thus, unsuitable for analyzing the dynamic situation of the home entertainment industry.

The temptation may be to try and force-fit the home entertainment industry and its component hardware into the traditional DOE modeling approach. This might entail treating the set-top box as a product, the set-top box manufacturer as a manufacturer, the MVPDs as a distribution channel and a homeowner as the end customer. However, this structure is unwieldy and not capable of capturing the dynamics of the home entertainment situation.

1. The set-top box is not a physical article of commerce where individual energy savings options can be added through hardware, measured, counted and costed. The set-top box is part of an evolving system with multiple opportunities to provide the same function either locally or remotely, through hardware or through software/firmware. In addition, the set-top box must fit within a broader system interacting with the headend and other systems. For example:

    a. A recent feature change at DIRECTV was the introduction of addressable TV advertising. All DIRECTV branded DVRs in the field have been upgraded with the capability to seamlessly insert advertisements that are targeted to a desired audience into live and recorded programs. The many changes to DVRs included capabilities to receive targeting attributes, record and store the relevant ads, choose ads for playback based on broadcast announcements and insert the chosen ads into in-progress programs with frame-accurate timing. Each of these changes required intensive modifications throughout the DIRECTV broadcast infrastructure adding new work flow, bitstream conditioning and trigger handling functions, as well as integrating new systems designed to manage profiles, schedule the ads, and perform audience measurement. The impact to headend and business systems to implement this new capability was an order of magnitude greater than the impact on the receivers themselves, and it took months of comprehensive testing to get all of these parts working in concert to deliver the desired result.

b. Likewise, satellite television did not convert from MPEG-2 to MPEG-4 set-top boxes for HD programming services with only a box change. The satellite industry's HD transition was accomplished with changes throughout the network, including new receiver dishes, DIRECTV's increase in satellite capacity through the launch of new satellites into new Ka-Band orbital slots, and new compression and other equipment installed in uplink centers. All told, billions of dollars were spent in effecting this transition.

c. As set-top boxes operate with more intelligence and functions moved into the network (such as program guides) and move to entirely IP operations, they can reach lower wattage states. Some of these offerings are available today to serve tablets and personal computers. But to support IP set-top boxes at scale requires far more than purchasing and deploying IP client set-top boxes. A cable operator would need to invest in additional network servers and encoders, additional distributed CDN (content delivery network) resources, clear additional distribution bandwidth for IP transport, and add more CMTS (cable modem termination system) resources to support such set-top boxes. Current estimates add well over a billion dollars in network costs to execute such a change across the cable industry, without even accounting for set-top box costs. These network, operational and other costs are not readily captured in the DOE modeling process.

2. The rapidly evolving nature of the MVPD and home entertainment industries makes projecting a "Base Case" virtually impossible. The traditional DOE approach is to project shipments of products and adjust those shipments for expected changes in product mix and efficiency to establish a Base Case without standards. The proliferation of potential future scenarios for home entertainment services renders this approach useless. Participants in the industry adjust flexibly to changing conditions, not to static forecasts. Developing and assessing alternative futures is a futile exercise that adds uncertainty rather than insight. There is no basis for determining the probability of any potential future scenario. The expected value and/or distribution of consumer or national impact results are not calculable.

3. Set-top boxes are part of a service and are changed out regularly by consumers or by the MVPDs. Therefore the expected life is short -- depreciable lives for set-top boxes range from 2-6 years.[6] This complicates an analysis of consumer payback for two reasons. First, the lifespan at the consumer for any set-top box will be short and often shorter than even the presumptive 5-year payback period considered in DOE consumer analyses.

[6] Annual reports for Comcast, Cablevision, DIRECTV and Dish Network

Second, the Base Case for any consumer analysis would need to evolve continually to reflect the fact that consumers get different set-top boxes with different characteristics many times over the course of a complete analytic cycle.

4. Even if it were possible to determine Base Case scenarios, they would need to incorporate the effects of any voluntary agreements or other situations that will affect future energy consumption for home entertainment services. These will reduce the potential gains that would accrue from any possible standards or other regulations.[7]

5. In addition, the lifetimes can be highly variable due to changes in feature sets and technologies. This is not well captured in the DOE models and the DOE approach of Monte Carlo simulations for equipment life does not reflect the high level of uncertainty and the potential for disruptive innovation. Monte Carlo simulations used by DOE are based on continuous probability functions that, in themselves, need to be derived from data. In the absence of a continuous function, the Monte Carlo simulation would need some sort of discrete but defined set of outcomes and probabilities, for which there is, by definition, no foundation for projection in the case of disruptive innovation that characterizes the set-top box market.

6. The proliferation of technologies and technological variations will strain any accumulation process past the breaking point. The range and variability of the imbedded assumptions on installed mix, operating conditions, product lifecycle, etc., will introduce error factors into the calculations. In 2013, MVPDs have myriad choices for the future: network and cloud-based delivery; conversion to HEVC; Ultra-HD; wired or wireless home networking; gateways or standalone devices; limited functionality devices like DTAs or switched digital video; and delivery to current and to-be-invented customer-owned devices. It is not possible to predict which technologies will be implemented or in what mix. Trying to address this problem with Monte Carlo simulations will only demonstrate that the confidence level in the ultimate results is very low. It will likely not be possible to distinguish between the energy and economic consequences of the post and the pre-regulatory scenarios with any confidence.[8]

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[7] Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes (Dec., 2012), available at http://www.ce.org/CorporateSite/media/ce_news/FINAL-PUBLIC-VOLUNTARY-AGREEMENT-(12-6-2012).pdf

[8] DOE has already seen this problem in the error bands introduced by its use of experience curves such that there is often a substantial overlap in the distribution of outcomes between base and standards cases: US Department of Energy, Preliminary Technical Support Document: Energy Efficiency Program For Consumer Products: Refrigerators, Refrigerator-Freezers, And Freezers, November, 2009, Table 5.9.1, p. 5-54.

7. The MVPD is not a manufacturer who creates a static appliance, places it into commerce, and leaves continuing responsibility to the end-user consumer. Nor is it a channel of distribution for such appliances. It owns, maintains, and changes the set-top boxes with changes in its network and services.[9] The current DOE notion of an incremental markup through a distribution channel does not and cannot be adapted to the case of an MVPD.[10]

8. While not explicitly a part of the DOE regulatory analysis, any DOE standard requires a testing and reporting structure. DOE is already finding limitations in its testing and reporting process for products with a wide variation in features and with either customization or rapid evolution. The concept of basic models and related testing and performance is proving unwieldy for commercial air conditioners and computer simulation programs are not proving to be a full answer. This same or greater complexity will be present in set-top boxes.[11]

These are examples of the issues DOE will face if it attempts to shoehorn set-top boxes into the existing regulatory analytical framework. That framework is simply designed around a completely different factual situation. DOE should abandon any attempt to apply its traditional analytical approaches and models to set-top boxes.

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[9] DOE and others have noted that the MVPD ownership of the set-top boxes creates an "agency problem" where the MVPDs own the boxes but the homeowners pay for the energy. While this is too complex a topic for full discussion here, MVPDs do have an incentive to use energy efficient set-top boxes. Set-top boxes that offer more features and services require increased processing power and memory. Pay TV providers own and maintain tens of millions of devices in consumer homes. If these devices fail, it means customer dissatisfaction, expensive customer service calls, and additional truck rolls. Lower power consumption generally means less heat and lower operating temperatures for devices, which can increase reliability, reduce service calls, and improve performance and device longevity. Energy efficiency helps meet customer expectations in a highly competitive environment. This is why the industry has devoted substantial resources that have already resulted in dramatic improvements in energy efficiency even as set-top boxes are being called upon to deliver more and more functionality.

[10] First, the notion of incremental variable costs would be hard to compute in this situation and would need to accommodate a wide range of software, firmware, hardware and other costs at the MVPD as well as installation and other costs. Second, the incremental margin concept requires the existence of "perfect competition" in the marketplace between the MVPD and the consumer. Again, a full discussion of this topic is too complex for this paper, but regulatory agencies have not concluded that perfect competition applies to the multichannel video marketplace and there are a variety of reasons why these assumptions and conclusions will not apply.

[11] As of late 2012, DOE has proposed extending the compliance date for new commercial air conditioner certification programs and has organized a convening to negotiate a new approach in the face of strong criticism from commercial air conditioner manufacturers: EERE-2012-BT-CE-0048.

Exhibit 3

May 9, 2013 Comments of CCTA and NCTA Filed in Response to the Invitation to Participate in the Development of Appliance Energy Efficiency Measures

Before the
CALIFORNIA ENERGY COMMISSION
Sacramento, California

In re Invitation to Participate in the Development of Appliance Energy Efficiency Measures Consumer Electronics (computers, displays, game consoles, set-top boxes)	Docket No. 12-AAER-2A

COMMENTS OF THE CALIFORNIA CABLE & TELECOMMUNICATIONS ASSOCIATION AND THE NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION

Lesla Lehtonen, Sr. VP, General Counsel
CALIFORNIA CABLE & TELECOMMUNICATIONS ASSOCIATION
1001 K Street, 2nd Floor
Sacramento, CA 95814

Rick Chessen, Sr. VP, Law & Regulatory Policy
Neal M. Goldberg, VP, General Counsel
William A. Check, Ph.D., Sr. VP, Science & Technology and Chief Technology Officer
Andy Scott, VP, Engineering
Jim Partridge, VP, Industry & Technical Analysis
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 Massachusetts Avenue, N.W. – Suite 100
Washington, DC 20001-1431

Paul Glist, Counsel to CCTA and NCTA
Davis Wright Tremaine LLP
1919 Pennsylvania Avenue N.W., Suite 800
Washington, DC 20006-3401

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COMMENTS OF THE
CALIFORNIA CABLE & TELECOMMUNICATIONS ASSOCIATION
AND THE
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION

The California Cable & Telecommunications Association ("CCTA") and the National Cable & Telecommunications Association ("NCTA") respectfully submit their joint comments in response to the Invitation to Participate in the Development of Appliance Energy Efficiency Measures[1] released by the California Energy Commission (the "Commission") with respect to set-top boxes.[2] CCTA and NCTA are the principal trade associations for the California and U.S. cable industries, respectively. Their members serve more than 90 percent of the nation's cable television households, including, in California, more than 5 million video subscribers, 6.4 million broadband subscribers, and 3.4 million competitive telephone service subscribers. The cable industry has invested more than $25 billion in California since 1996 to build interactive

[1] Invitation to Participate in the Development of Appliance Energy Efficiency Measures, California Energy Commission (rel. March 25, 2013).

[2] CCTA and NCTA have not addressed the ambiguous category of "network equipment" referenced in the proposed schedule for the Staff Workshops in this proceeding because it was not included in the Invitation to Participate. The Warren-Alquist Act requires the Commission to engage public participation and provide advance notice of an opportunity to participate prior to the adoption of any standards. *See* Cal. Pub. Resources Code § 25402(c)(1). The Commission has not provided sufficient notice or guidance to enable the public to understand the scope of "network equipment" that may be considered for potential regulation.

broadband networks that are available to 98 percent of all California households. The cable industry in California employs more than 65,000 people, contributes $800 million in taxes and fees, and supports more than 1.5 million workers in California alone.

Executive Summary

The federal Cable Act squarely preempts the Commission from imposing energy standards or other technical requirements on cable set-top boxes. The U.S. Supreme Court, Congress, and the Federal Communications Commission have all made clear that no state may prohibit, condition or restrict a cable system's use of any type of subscriber equipment, because, as Congress put it, "a patchwork of regulations that would result from a locality-by-locality approach is particularly inappropriate in today's intensely dynamic technological environment." The Commission abandoned consideration of regulating cable set-top boxes in the face of this argument before, and should do so again.

But as we will demonstrate first, Commission regulation is unwarranted and unnecessary in any event under the standards of the Warren-Alquist Act. Cable operators have already initiated a comprehensive energy conservation program that will deliver even more energy savings than were sought by advocates of regulation at the outset of this proceeding. This program will do so in a manner that will deliver better products and services to consumers.

In 2011, the California Investor Owned Utilities ("IOUs") and the Natural Resources Defense Council ("NRDC") proposed that the Commission create state energy-efficiency standards that would require set-top boxes to meet ENERGY STAR Version 3.0 standards. In 2012, the multichannel video programming distributor ("MVPD") industry did exactly that, and more, through the landmark Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes ("Voluntary Agreement"). The Voluntary Agreement was entered

into by fifteen industry leaders representing all of the major MVPDs in the United States serving more than 90 million American households and 90% of Pay TV consumers, including all of the largest MVPDs in California. The first phase of its implementation includes commitments by all of these MVPDs that 90% of their new set-top boxes purchased after December 31, 2013 shall meet the efficiency standards established for ENERGY STAR Version 3.0.

But the MVPD commitments under the Voluntary Agreement go much further: downloading "light sleep" energy efficiency capabilities to existing set-top boxes in the field; providing "automatic power down;" making energy-efficient whole-home Digital Video Recorder ("DVR") solutions available nationwide as an alternative to multiple in-home DVRs; and a commitment to field-test next-generation cable set-top boxes with an even more reduced power consumption mode and to deploy them if successful.

To bolster accountability and transparency for consumers and regulators, the Voluntary Agreement provides for publication of product power consumption information for new set-top boxes by each company, testing against a uniform ANSI test method, verification of set-top box performance in the field, annual public reporting on energy efficiency improvements, compliance audits, and monitoring by an independent administrator. Because the Voluntary Agreement is designed to be dynamic, its Steering Committee is already working on even more aggressive voluntary measures for later years of this five-year initiative, as the technology advances and in consultation with government agencies and energy efficiency advocates.

The cable industry therefore is already delivering the energy savings that the IOUs contended was the objective of and justification for Commission regulation. The Commission is required by the Warren-Alquist Act to consider alternative approaches before it can impose any

regulations on set-top boxes, and therefore must consider relying on the alternative of ongoing industry initiatives as a means of achieving its energy efficiency objectives for set-top boxes.

Yet the Commission seems to still be continuing a regulatory approach that threatens to undermine the energy efficiency and innovation it should be protecting. The Commission's energy efficiency approaches were simply not designed for dynamic and fast-moving video networks, where set-top boxes operate as part of constantly changing networks, get new downloads in the field, and change functions as services evolve. Commission energy efficiency processes were designed for standalone "appliances" that perform basically one function and do not change over a long life, like refrigerators. But set-top boxes are not appliances; they are components of complex service provider networks. If the Commission applies its appliance model to the video marketplace, it will end up with energy caps set for yesterday's services. New consumer services would be put on hold while the Commission considered rule changes or waivers to accommodate delivery of those new services. Innovation, consumer choice and competition would be stifled as manufacturers and MVPDs would remain handcuffed to outdated rules that, by the nature of the regulatory process, cannot quickly be changed. The Warren-Alquist Act requires the Commission to consider these impacts on "product efficacy for the consumer" that would result from contemplated regulations.

In contrast, the Voluntary Agreement model can adapt to changes in technology and the market much more quickly and nimbly than regulations. This will enable service providers to develop energy efficiency techniques that do not impede innovation and competition and that preserve or enhance the customer experience so that consumers do not reject them. The Voluntary Agreement has received strong bipartisan praise from Senator Feinstein and other members of Congress as an exemplar of how to address complex energy efficiency challenges.

With counterpart agreements in Europe and Australia, this has become an internationally approved approach.

Set-top boxes are not standalone, static products. They are integrated components of distribution networks that differ significantly in network architectures, transmission protocols, software stacks, conditional access security systems, out-of-band communications channels used for command and control of the set-top box, operating system and processor instruction sets, network control architectures in support of interactivity, and electronic program guide applications and guide metadata formats, among other variables. Changes to set-top boxes entail changes in the network, and network costs, that the Commission approach does not seem to take into account. Under the Warren-Alquist Act, all "standards shall be drawn so that they do not result in any added total costs for consumers over the designed life of the appliances concerned." Thus, the Commission must consider not only the increased price for set-top boxes that would be caused by regulation, but also the substantial costs that regulation would impose on MVPD networks, which ultimately would be borne by consumers.

For all of these reasons, the Commission should withdraw its consideration of set-top boxes to give the Voluntary Agreement an opportunity to work. CCTA and NCTA welcome the active engagement of the Commission, the IOUs, and other parties to shape further phases of the Voluntary Agreement for the benefit of California consumers and continued improvements to energy efficiency.

I. THE COMMISSION MUST RECOGNIZE THAT SET-TOP BOXES OPERATE AS INTEGRAL PARTS OF LARGER NETWORKS

A. Product Definition and Scope

The Invitation to Participate includes set-top boxes under the category of "consumer electronics," for the purpose of considering whether they should be regulated under the Warren-

Alquist Act's framework for "appliances."[3] But set-top boxes are unlike other consumer electronics devices, and they certainly are not appliances.

A set-top box instead is a deeply-integrated part of a video distribution network. Set-top boxes have evolved out of a necessity: when cable operators offer services that exceed the capability of consumers' television sets, they must offer the technical means for customers to receive the services. Set-top boxes initially offered an expanded channel tuning range, a remote control, or optional premium channels scrambled in transport and descrambled in the device. More recently, different devices offer varying innovative features reflecting new consumer demands, including high definition (HD) resolution; multiple tuners to allow simultaneous watching and recording of multiple channels; on-demand programs available at the touch of a button; digital video recording (DVR) capability; increased storage capacity; "switched digital" channels that are only delivered over the cable network when a customer tunes to that channel; increased processing power and memory for advanced applications running on the device; multi-room playback and home networking of content from the device to other devices in the home; remote programming of the DVR from a mobile device; 3D video content; and transcoding content from one format to another to allow consumers to view it on a variety of consumer electronics devices.

Set-top boxes have been developed in connection with many different service providers' ever-changing services, delivered over many different types of distribution networks. Set-top boxes used by cable operators are different from those used by direct broadcast satellite providers, telephone companies, and over-the-top video service providers, all of whom use very different distribution networks. But there is an enormous variation even within the cable

[3] *See* Cal. Pub. Resources Code § 25402(c).

industry. Cable systems broadcast a set of linear (pre-scheduled) channels in a variety of formats. For example, some systems broadcast in both analog and digital, while others rely solely on digital, QAM-based video delivery, and still others use a mix of QAM-based delivery and Internet Protocol ("IP")-based delivery. Cable systems also offer a wide variety of additional applications that require different types of set-top boxes. At the same time, operators must ensure that the customer premises devices are tightly integrated with the headend (source) of the network.

Today's advanced set-top boxes are an integral part of the complete network system. To receive signals from a cable headend supplied by Cisco, the customer needs a Cisco set-top box (or other client device) or Cisco CableCARD. To receive signals from an ARRIS (formerly Motorola) headend, the set-top box (or other client device) must be from ARRIS or have an ARRIS CableCARD.[4] Regardless of manufacturer, the devices must work in concert with the entire network system, rather than as stand-alone products. The semiconductor chip processors and interfaces in the device must be able to communicate with the rest of the network system at all times. All components must be designed and configured to be compatible and interact with a variety of network architectures, transmission protocols, software stacks, conditional access systems, out-of-band communications channels used for command and control of set-top boxes, operating system and processor instruction sets, network control architectures in support of interactivity, and electronic program guide applications and guide metadata formats, among other variables. Set-top functions that may in one system be performed in a set-top box in another system may be performed in headend equipment or elsewhere in the network.

[4] Thus, for example, the two-way Pace set-top boxes referenced in these comments are deployed with ARRIS (formerly Motorola) or Cisco CableCARDs.

Set-top boxes and networks vary not just from cable operator to operator, but often from cable system to cable system. There are approximately 1,100 cable operators operating more than 7,000 headends in the United States, with countless permutations of hardware and software designs. Though six cable operators now provide service to approximately 85% of U.S. cable subscribers, they operate systems with often substantial diversity in their networks and set-top boxes. There is not only substantial variation among these six operators, but also within their companies as well. There can even be considerable variation among systems owned by the same company due to a history of cable system transfers and consolidation, leaving the owners today with a wide variety of system architectures and technologies within single companies.[5] Today's cable systems thus encompass "a set of legacy digital video delivery systems that have a huge installed base of tens of millions of digital cable set top boxes," and system technology that "spans over a decade of technology advances resulting in a broad range of set-top capability and performance."[6] Accordingly, set-top boxes continue to have significant "variations on processor, memory, graphics and video processing capabilities that occurred over ten years of set-top technology development."[7]

Even in a single cable system, a cable operator deploys many different types of set-top boxes, depending, among other factors, on the services ordered by a particular customer and the equipment owned by that customer. For example, if a consumer wants to receive high definition programming, the device deployed in that consumer's home must have the processing power

[5] *Compare, e.g. Fifth Annual Report*, 13 FCC Rcd 24284, 24422 (1998), Table C-3 ("1998 MVPD Horizontal Concentration Nationwide") with *Annual Assessment in the Status of Competition in Markets for the Delivery of Video Programming Services*, 24 FCC Rcd 542, 556 (2009), Table 2 ("Top MSOs' Basic Cable Subscribers – Year End 2004 to June 2006"); *id.* at 687, Table B-3. While the number of operators decreased between 1990 and 2012, the number of customers served by the industry increased by 55% (from 50,000,000 total basic subscribers to 77,655,000). Television & Cable Factbook No. 80, Cable Vol. at F-1 (Table, "Estimated Growth of the Cable Industry") (Warren 2012).

[6] Ralph W. Brown, *Tackling the US Cable Set-top Legacy: Middleware in a Sea of Proprietary Systems* at 1.

[7] *Id*. at 6.

required for full 1080p/60 HD resolution. Likewise, sophisticated devices are required to support 3D TV and 3D graphics. If a consumer wants to record, pause, rewind, or fast-forward programming, MVPDs typically provide a DVR with multiple tuners so that the customer can watch one program while simultaneously recording others. As more advanced applications are integrated into cable services, the set-top box will require more processing power (i.e., greater CPU and memory resources). On the other end of the spectrum, the cable industry has also deployed millions of low-wattage digital transport adapters (DTAs) that perform basic one-way set-top box functions for consumers.

Because set-top boxes have been developed in connection with many different service providers' ever-changing services, delivered over many different types of distribution networks, set-top boxes are not interchangeable commodities such that consumers or service providers can swap any one set-top box for another in order to choose devices that, when measured in isolation, may be more energy efficient. And because video services are evolving and innovating rapidly, the relationships between set-top boxes and other parts of video distribution networks are constantly changing. Unlike the case with most consumer electronics and appliances, cable customers generally do not own set-top boxes or possess them for the life of the device; instead, most are provided by multichannel video programming distributors (MVPDs) under a monthly lease arrangement or as part of a bundled package of equipment and services, and consumers may return set-top boxes if they change services, switch devices, move, or cancel service.

As a result of all of these factors, there is an enormous diversity of cable set-top boxes. Just one CCTA member alone has more than 80 different models of set-top boxes deployed today in California, and not a single one of them would be used by either satellite provider, or AT&T, each of which use their own multitude of devices. Thus, it may be impractical for the

Commission to try to evaluate a "complete set of market data" for all set-top boxes in use in the state, as requested by the Invitation to Participate. It would also be unnecessary to do so, since older legacy models that are no longer being purchased in significant quantity need not be evaluated in a forward-looking proceeding. More than 70% of the California cable operators' newest purchases and installations are ENERGY STAR 3.0 compliant, and this will increase to more than 90% next year under the Voluntary Agreement. These include current models of DVRs from Motorola, Cisco, and Pace that use between 16.8-23 watts, the Pace RNG110RF two-way HD non-DVR set-top box that uses only 12.3 watts in active mode, and the Pace DC50Xu DTA that uses only 3.3 watts in active mode. Many additional models that meet ENERGY STAR standards are being used today, and more and more models of energy-efficient set-top boxes will proliferate in the next few years now that the large MVPDs are committed to their purchase under the Voluntary Agreement. As we will demonstrate in Section II below, the energy efficiency of these new set-top boxes that are most commonly being deployed by cable operators in California today demonstrate that the industry has already risen to the challenge posed by the IOUs just two years ago.

B. The Commission Must Consider the Impact of Any Regulation of Set-top Boxes on the Efficacy of Networks and Services

The Commission is required to consider the impact its regulations would have on "product efficacy for the consumer."[8] Because set-top boxes operate as integrated parts of complex networks for the delivery of services, the Commission's required analysis should evaluate the effect of regulations not just on the set-top boxes themselves but on the video service provider's overall network and services. In particular, this holistic approach is necessary

[8] Cal. Pub. Resources Code § 25402(c)(1) ("When determining cost-effectiveness, the commission shall consider the value of the water or energy saved, impact on product efficacy for the consumer, and the life cycle cost to the consumer of complying with the standard.").

when evaluating any assumptions (such as those advanced by NRDC in 2011) that set-top boxes are not "in use" when the consumer is not watching or recording programming, or can easily be placed into a "deep sleep" mode essentially disconnected from the network.

Even when they are not actively being used to display video, set-top boxes are receiving important software updates and navigation information (such as changes in channel location), populating program guides with the latest programming schedules and descriptions, receiving Emergency Alert System (EAS) messages, and receiving and sending other data for diagnostics, software updates, and conditional access and entitlement mechanisms to authorize the viewing of different premium channels and tiers of service, to assure that the service delivers the functionality expected and enjoyed by consumers. Set-top boxes with DVR functionality are expected to record programming as scheduled by the customer. These functions require that the set-top box that serves as the interface between a television and the network is working in the background, in constant contact with the cable system headend, even when the television is turned off, to always be ready to meet demands for instant viewing, remote programming of the DVR from mobile devices, and other functionalities.

For these reasons, any rule that effectively required set-top boxes to lose communication with a cable headend could have significant adverse effects on the efficacy of cable video services and require a lengthy recovery period. The IOUs acknowledge that "deep sleep states have the potential to increase wake time to several minutes" which "would result in consumer acceptance issues."[9] Tests by CableLabs, the cable industry's research and development

[9] Docket No. 11-AAER-1, Proposal Information Template for: Set-Top Boxes and Small Network Equipment, at 8 (Sept. 30, 2011) ("California IOU Proposal").

consortium,[10] show significant problems if a set-top box is powered down so far as to lose its connectivity to the network and the operation of functions that typically run in background. The problems are best illustrated by set-top box behavior when it is unplugged from a power source.

- *Lost Guide Data.* Guide data is populated from the network to an operational set-top box. If a set-top box is unplugged, for example, the consumer will lose most or all guide data. When the set-top box is later powered on, the user will see the guide populated with "No Data Available" for all program listings for up to a couple of hours, until the set-top box receives updated information from the network.
- *Lost Recordings.* Set-top boxes equipped with DVR capabilities will not complete their scheduled recordings if they cannot wake to record.
- *Software Problems.* Set-top boxes require regularly-updated software to implement new features and functions, fix reported bugs, and communicate properly with the network. If a set-top box loses that connection and functionality, such as when it is unplugged, it will not receive these updates. When powered back up to active mode, the set-top box may go into a forced upgrade at boot-up for approximately 40 minutes *before* tuning video or populating a guide.
- *Lost Security Keys.* Each set-top box must remain connected to the network to maintain its security relationship with network-based servers. If it loses that connection for prolonged periods (*e.g.* 3 to 4 weeks) or during an unscheduled

[10] Since its founding in 1988, CableLabs has served as the major research and development laboratory for the cable industry. Modeled on Bell Labs, CableLabs has more than 160 employees (including more than 120 technical staff) in addition to large numbers of visiting engineers.

security refresh (*e.g.* to renew security in the event of a breach or attack), the set-top box could lose the entitlements that give it the ability to decrypt content. The user will need to call the cable operator to reset it and will not be able to play most content until this is done.

- *Compromised Incident Response.* Cable operators actively monitor their networks to determine whether there are outages that must be repaired. If a set-top box loses its connection, it does not answer a ping sent from the network. When there are a number of such set-top boxes in a given service area, operators surmise there is a significant plant issue and take action to remedy it.[11] Investigating such "false positives" slows operators' ability to respond to actual plant issues (such as downed utility poles), causing truck rolls with needless environmental impact and unnecessary operator expense.

These examples of the critical importance of network connectivity illustrate the significant adverse impact that ill-conceived regulation of set-top boxes could have on a service provider's network and the efficacy of cable services delivered to the consumer. The Commission must weigh these broader effects on the video service ecosystem in considering any proposals to regulate set-top boxes.

C. The Commission Must Evaluate the Cost of Set-Top Regulation on the Entire MVPD Network

Under the Warren-Alquist Act, all "standards shall be drawn so that they do not result in any added total costs for consumers over the designed life of the appliances concerned."[12] If regulation of set-top boxes resulted in changes to set-top box design or functionality, that would

[11] Proactively monitoring the network via set-top boxes allows outage repairs to take place in the middle of the night, thereby reducing customer impact.

[12] Cal. Pub. Resources Code § 25402(c)(1).

result not only in additional costs for set-top boxes, but also substantial costs to adapt MVPD networks to the changes. Additional network costs resulting from set-top box regulations would flow through to consumers through higher service fees.

Set-top boxes are part of integrated networks that rely upon real-time connectivity and communication. Because of that relationship, changes required at the set-top box level necessitate changes at the headend and network level. For example, the IOUs acknowledge that "deep sleep implementation would [] require significant research and development expense to update head-end and system-wide software capabilities."[13] Redesigning set-top boxes requires significant network investment to make the system operate effectively as a whole.

The same is true for energy efficiency. Existing cable network architectures are the product of the diverse design needs of the many owners who built those systems. We have explained that set-top boxes cannot lose a connection to the network without losing critical data, network updates, and the entitlement messages that authorize customers to receive and decrypt the programming to which they have subscribed. Part of the reason is that systems were designed around narrow out-of-band control channels through which data must be continually fed in order to keep millions of set-top boxes up to date. The set-top boxes must remain connected to receive that narrow data stream.

As an alternative for control signaling, some systems use the DOCSIS Set-top Gateway (DSG), which provides greater bandwidth. But to use DSG, the network itself has to be changed and all legacy devices on that plant need to be physically replaced before the system can redesign network updates exclusively around DSG. Similar issues arise with architectures in support of new forms of guides. For example, Comcast's next-generation Xfinity TV cable service features

[13] California IOU Proposal at 7.

an enhanced program guide that is hosted from the network rather than resident in the set-top box.[14] Moving guide data back into the network can conserve set-top box resources, but hosted navigation in the network is very expensive due to costs of network hosting equipment and bandwidth. Changing the set-top box to gain some measure of efficiency carries a cost to the network and to the headend.

Middleware provides another illustration. Because the native languages of set-top boxes and headends were not built for interoperability, applications written to one platform do not automatically work on another. To surmount this challenge, the cable industry created the Java-based OpenCable Application Platform (OCAP) as a middleware layer between the native code of set-top box hardware and applications intended for wide dissemination. Today, some major cable operators are using OCAP applications to put certain DVRs into "light sleep" when they are not being actively used for viewing or recording, but achieving that result comes with a cost. Specifically, at the set-top box level, the OCAP stack requires larger memory and processing power than older equipment. And OCAP also requires substantial network and headend investment.[15] Moreover, not all systems support OCAP, and even OCAP systems continue to serve millions of set-top boxes that still speak only native code. So deploying comparable protocols in such systems would require, at a minimum, the development of support at the headend for new applications for the native code in each set of set-top boxes used in that system. The problem is even more challenging for "deep sleep" solutions and the ability of set-top boxes

[14] *See* Meg James, *Comcast Chief Brian Roberts Unveils Next Generation Xfinity TV System*, L.A. Times, June 16, 2011, *available at* http://latimesblogs.latimes.com/entertainmentnewsbuzz/2011/06/comcast-chief-brian-robertsunveils-faster-xfinity-tv-system-.html; Press Release, Comcast Corp., Comcast Chairman and CEO Brian L. Roberts to Unveil Next Generation Television Experience and New Generation Television Experience and New Broadband Speeds (June 14, 2011), *available at* http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=1097.

[15] For example, one cable operator alone invested over $100 million in software to implement OCAP on both the network and in the set-top box. Additional investment was required in application servers to communicate with the newly configured set-top boxes.

to reduce power consumption, be awakened by the wide area network or the local area network, and to channel critical data, network updates, firmware updates, and entitlements to each set-top box in new ways. These all require changes in the network.

The Commission cannot impose regulations on set-top boxes under the Warren-Alquist Act without considering all of these network costs, which ultimately would be borne by consumers.

II. UNDER THE WARREN-ALQUIST ACT, THE COMMISSION MUST CONSIDER THAT THE INDUSTRY IS ACHIEVING ENERGY CONSERVATION OBJECTIVES UNDER THE VOLUNTARY AGREEMENT

The Commission is required by the Warren-Alquist Act to consider alternative approaches and their associated costs before imposing any regulations on set-top boxes.[16] Such an analysis will make clear that no regulations should be adopted, given that the industry has already committed to a program that will secure more energy savings than were originally proffered as the supposed basis for state regulation.

A. Cable Operators Have Strong Incentives to Pursue Energy Efficiency

The IOUs are wrong in asserting that regulation is necessary because MVPDs have "no fiscal pressure to address power consumption."[17] Cable operators in fact do pursue energy efficiencies for set-top boxes. Improvements in set-top box energy efficiency mean improved total cost of ownership (including purchase, maintenance, and repair), fewer trouble calls, and better performance in a competitive marketplace. Cable operators own and maintain tens of millions of devices in consumer homes. Lower power consumption generally means less heat

[16] *See* Cal. Pub. Resources Code § 25402(c)(1) ("The commission shall consider other relevant factors, as required by Sections 11346.5 and 11357 of the Government Code, including, but not limited to, the impact on housing costs, the total statewide costs and benefits of the standard over its lifetime, economic impact on California businesses, and alternative approaches and their associated costs.").

[17] California IOU Proposal at 3.

and lower operating temperatures for devices, which translates into lower component failure rates and fewer service calls to remediate failed equipment. If these devices fail, it means customer dissatisfaction, expensive customer service calls, and additional cable truck rolls. In a marketplace with formidable competitors that are constantly vying with one another for subscribers, cable operators are eager to avoid these consequences and therefore embrace energy efficiency. Competition also incents cable operators to make available energy efficient set-top box options to consumers who are concerned about consumption.

Likewise, cable operators strongly favor technological improvements that lead to better energy efficiency for the set-top boxes they provide to consumers. For example, the integration of components onto "systems on a chip" would reduce overall component count in each device, which would mean both lower failure rates and lower energy consumption. Generational chip changes often deliver lower energy consumption even as they provide increased processing horsepower which allows them to run better applications and user interfaces for consumers.

Individual cable operators and consumer electronics manufacturers have been committed to energy efficiency for years, and recently have moved toward even greater collective action. In 2011, the six largest cable operators committed to a substantial conservation program that included the creation of CableLabs - Energy Lab (a specific facility within CableLabs dedicated to improving energy efficiency), focused projects to increase the efficiency of set-top boxes through development of "light sleep" and "deep sleep" set-top box modes, and cable operator procurement commitments for set-top boxes that meet ENERGY STAR standards. Energy Lab has brought together operators, suppliers and developers to seek consensus on "deep sleep" solutions and other energy-saving measures that can meet consumer expectations for instant viewing while significantly improving energy efficiency. CableLabs brings to the task a unique

test laboratory that has assembled the wide and rapidly-changing variety of hardware, software, code drops, and key applications used by cable operators nationwide. This environment, created for product certification, interoperability testing, and product development for cable operators and suppliers, is ideal for development of energy efficiency specifications and test methodologies tailored for "real world" cable systems that can provide a consistent, repeatable, and accurate measurement of energy consumption.

These recent cable operator initiatives laid the foundation for the industry-wide Voluntary Agreement, discussed below, which demonstrates that MVPDs are continuing to act decisively on their incentives to improve the energy efficiency of set-top boxes.

B. The Voluntary Agreement is Producing More Energy Savings Than the IOUs Previously Sought in this Proceeding

In 2011, the IOUs proposed that the Commission create state energy standards in which "the base and additional functionality TEC levels should be set at ENERGY STAR 3.0 levels, and the standard should adopt ENERGY STAR 3.0 device definitions and test procedure."[18] But in 2012, the MVPD industry did exactly that, and more, through the landmark Voluntary Agreement entered into by fifteen industry leaders representing all of the major MVPDs in the United States (including all of the largest MVPDs in California) serving more than 90 million American households and 90% of Pay TV consumers.[19] The Voluntary Agreement includes commitments by all of these MVPDs that 90% of their new set-top boxes purchased and deployed after December 31, 2013 shall meet the efficiency standards established for ENERGY STAR Version 3.0. The Voluntary Agreement participants already are ahead of schedule. For example, the cable industry alone has deployed 13 million ENERGY STAR 3.0 set-top boxes,

[18] California IOU Proposal at 14.

[19] The Voluntary Agreement is attached hereto as Exhibit 1.

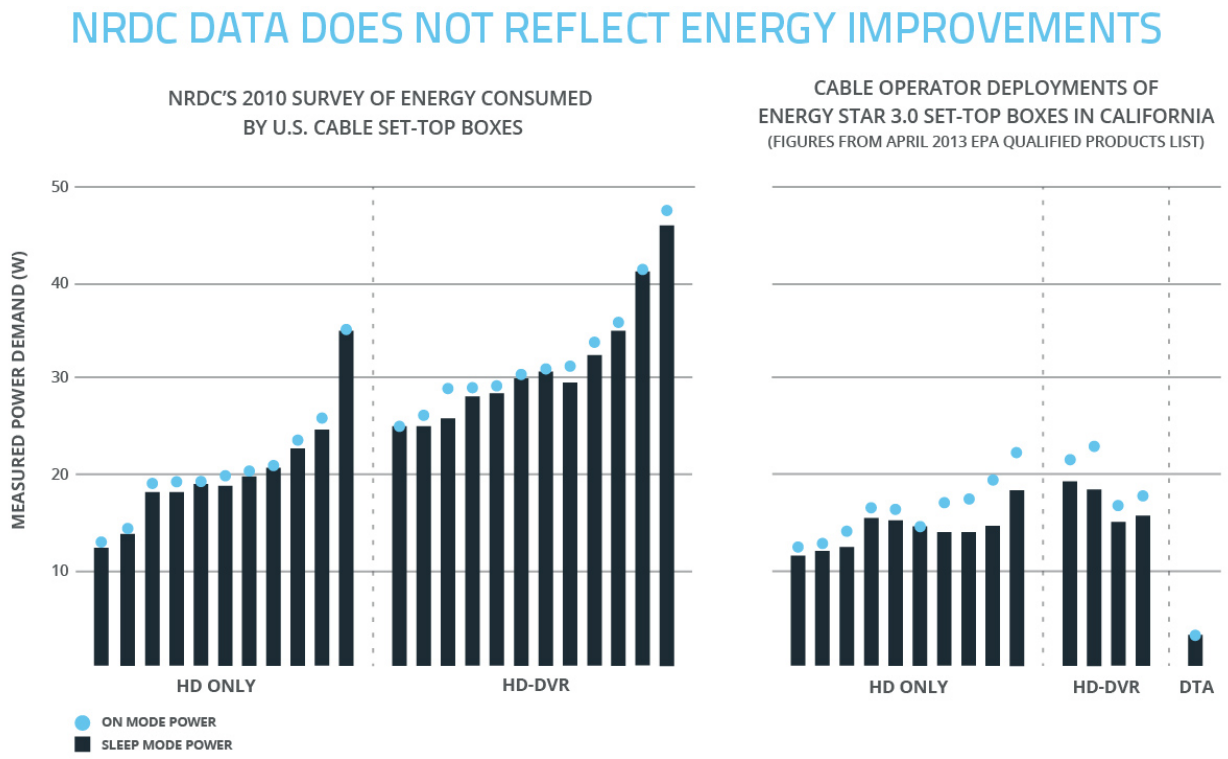
and over 70% of their newest purchases and installations are ENERGY STAR 3.0 compliant. Moreover, a large number of these set-top boxes are highly-efficient DTAs, such as the Pace DC50Xu, which is deployed by the state's largest cable operator, Comcast, and uses only 3.3 watts in active mode. More than one-third of Comcast's set-top boxes deployed in California are now DTAs, which save millions of kWh per year.

When fully realized, this phase of the Voluntary Agreement will result in annual residential electricity savings of at least $1.5 billion nationwide, reducing carbon emissions by the equivalent of four power plants annually. The set-top boxes now being purchased and deployed by cable operators for use in California far surpass the energy efficiency of the devices highlighted by the Natural Resources Defense Council (NRDC) and the IOUs in their prior submissions to the Commission.[20] The IOUs projected that California regulations would reduce the average energy consumption of a cable set-top box by 21% to 24%.[21] At the time, NRDC acknowledged that its "estimates do not incorporate potential market adoption of efficiency measures without a standard. It is unclear at this time what level of adoption the new ENERGY STAR specifications for STBs will achieve."[22] The following chart shows that the cable industry is delivering far more in energy savings in California than the IOUs proposed, and is already meeting what would have been the objective of Commission regulation. The chart compares the NRDC study (on the left hand side) with the ENERGY STAR 3.0 efficiency levels of set-top boxes commonly being deployed today by cable operators in California (on the right hand side). These and other boxes that meet the ENERGY STAR 3.0 standards will be the national and California norm in 2014 under the commitments of the Voluntary Agreement.

[20] *See* Docket No. 11-AAER-1, NRDC Title 20 Recommendations for Electronics Products (Aug. 31, 2011) ("NRDC Recommendations"); California IOU Proposal.

[21] California IOU Proposal at 11, 13 (DVR to be reduced from 270 kWh/year to 204 kWh/year; non-DVR to be reduced from 180 kWh/year to 143 kWh/year).

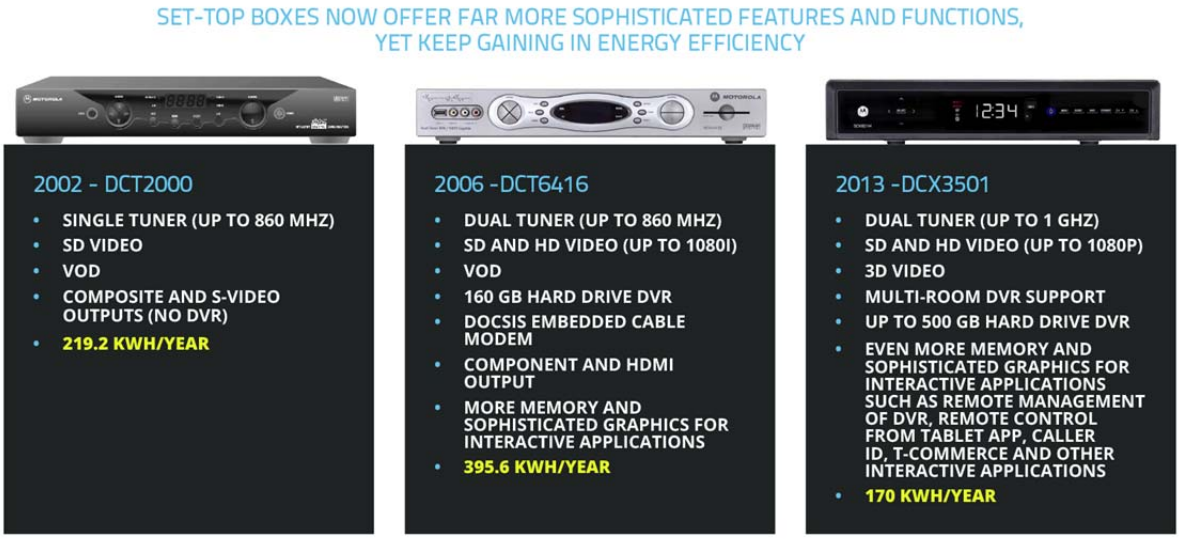
[22] *See* NRDC Recommendations at 3, 18.



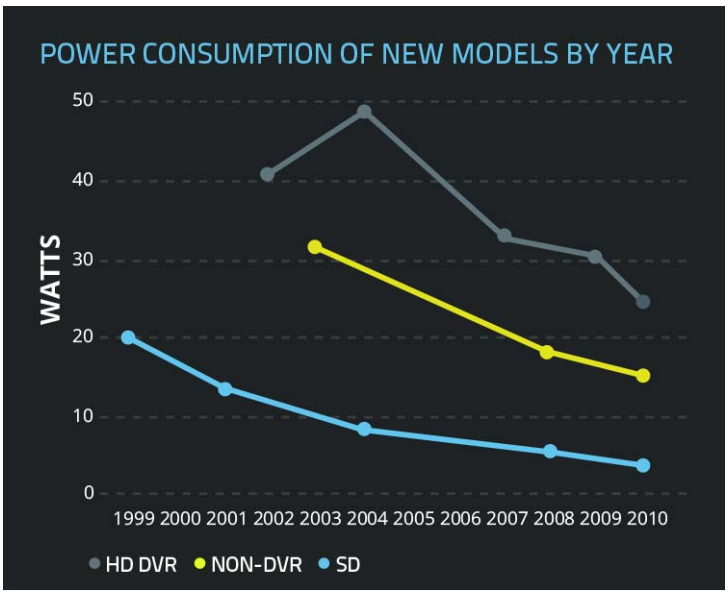
Not only are individual models much more energy efficient today than estimated by NRDC, but so too is the overall energy use for set-top boxes in a typical home. NRDC's report assumed, incorrectly, that a typical cable home have one HD DVR and one HD set-top box. Today, a "typical home" is increasingly likely to have a digital transport adaptor (DTA), a limited functionality device which consumes about a quarter of the power draw of the digital set-top box included in the report. As noted above, more than one-third of Comcast's set-top boxes in California now are energy-efficient DTAs, which were entirely omitted from the NRDC report.

The dramatic improvement in energy efficiency of set-top boxes is particularly notable because, unlike appliances regulated by the Commission, set-top boxes are rapidly adding additional capabilities and features, while still gaining in energy efficiency. Newer generations of models have supported high-definition and 3D output, digital recording, interactive

applications, home networking, and numerous other features that were not included in older models. The following comparison of successor set-top box models highlights this energy-efficient evolution:



As a result, even with the rollout of new features, set-top boxes have consumed less energy over the course of the past decade:



This long-term trend shows that the Voluntary Agreement's further improvements are a continuation of success by cable operators in increasing the energy efficiency in set-top boxes while offering more functionality and services to consumers. Enhancing functionality while delivering additional energy efficiency has required substantial financial and resource investment by cable operators, and is not, as the IOUs baselessly suggested to the Commission in 2011, a "zero" incremental cost commitment.[23]

The Voluntary Agreement is already achieving the ultimate energy savings that proponents of Commission regulation sought to realize through regulation. Reliance on the Voluntary Agreement therefore must be considered under the Warren-Alquist Act's requirement that the Commission consider alternative approaches and their associated costs before imposing energy regulations on set-top boxes.[24]

C. The Voluntary Agreement Is Delivering Numerous Additional Benefits

The Voluntary Agreement also includes much more than the ENERGY STAR 3.0 commitments that were the basis for the IOUs' call for Commission regulation. Pursuant to the Agreement, cable operators have downloaded "light sleep" energy efficiency capabilities to 12 million set-top boxes that are already in homes, allowing those devices to reduce power consumption after typically four hours of inactivity and saving $50 million in residential power annually. Signatories also are providing "automatic power down" and prescheduled sleep, which can give more control to an individual consumer to select a power option suitable to their usage pattern. Parties are also making energy-efficient whole-home Digital Video Recorder ("DVR") solutions available nationwide as an alternative to multiple in-home DVRs.

[23] California IOU Proposal at 7.

[24] *See* Cal. Pub. Resources Code § 25402(c)(1) ("The commission shall consider other relevant factors, as required by Sections 11346.5 and 11357 of the Government Code, including, but not limited to, the impact on housing costs, the total statewide costs and benefits of the standard over its lifetime, economic impact on California businesses, and alternative approaches and their associated costs.").

Research and development for next-generation cable set-top boxes with even lower power consumption modes are well underway, with multiple experts and a dedicated cable industry Energy Lab established to facilitate these efforts. The Voluntary Agreement commits cable operators to field-test such units in 2014 and to deploy them if successful. Next generation set-top boxes will use new chips, new specifications, and new software, all of which need to be integrated into a wide variety of complex cable networks that were built at different times with different design, signaling, software, security, program guides and other applications and services that must all work together.

To bolster accountability and transparency, the Voluntary Agreement adopted processes for verification of set-top box performance in the field,[25] with compliance monitored by an independent administrator and each participant subject to audit.[26] To measure compliance, the Voluntary Agreement has adopted a comprehensive test procedure, CEA-2043, that has been developed and vetted by experts from industry, government, and elsewhere under the formal, open standards-setting process of ANSI. CEA-2043 is superior to any government-imposed test procedure because, among other reasons, it can be changed far more often and quickly to meet the ongoing and inevitable future changes that will come to the market. By incorporating ENERGY STAR efficiency standards and CEA-2043 test procedures, the Voluntary Agreement has created a uniform national standard for the testing and energy efficiency of set-top boxes.

The signatories are already meeting regularly to update energy efficiency measures as the science advances, and will continue to consult with government agencies, energy efficiency advocates, and others.

[25] *See* Exhibit 1, Voluntary Agreement at § 8.2.

[26] *Id*. at §§ 7, 8.

The Voluntary Agreement will also improve access to energy efficiency information for consumers, producers, policy advocates, and the government. Energy consumption information for ENERGY STAR 3.0 set-top boxes is already posted by EPA on its public web site. In addition, each signatory to the Voluntary Agreement will publish product power consumption information for its new set-top boxes for its customers.[27] Publishing this information will make it easier for consumers to learn about their potential choices of energy-efficient set-top boxes, to learn about their typical energy usage, and to consider the energy efficiency of set-top boxes when selecting among their many choices in video service providers—including cable, satellite, telephone, "over-the-top" video networks delivering to game consoles and "smart" TVs. The parties to the Voluntary Agreement will also publish annual public reporting on energy efficiency improvements that will assist power producers and others in gauging overall demand and trends in set-top box energy consumption.[28]

This kind of voluntary, flexible development is critical if energy efficiency measures are to work with the highly varied, complex and rapidly evolving nature of set-top boxes and the networks and services with which these set-top boxes are integrated. It is also essential that energy efficiency techniques do not impede the innovation and competition which have long characterized these industries and that they preserve or enhance the customer experience, so that consumers do not reject them.

The Voluntary Agreement has received strong bipartisan praise from members of Congress as an exemplar of how to address complex energy efficiency challenges, including from Senator Dianne Feinstein, who agreed that the Voluntary Agreement "will save consumers

[27] *Id*. at § 7.5. The Voluntary Agreement provides a service provider with the flexibility to present information to consumers "in broad averaged categories" in order to accommodate the wide variety of software and hardware combinations in use and the fact that not all set-top boxes used by a cable operator can run on all systems.

[28] *Id*. at §§ 7.6, 10.1.1.2, Annex 8.

billions of dollars in reduced electricity bills."[29] Governments in Europe and Australia have also elected to rely on voluntary agreements to pursue energy efficiency objectives for set-top boxes.[30] By contrast, as demonstrated below, state regulation could throttle innovation, delay or derail cable operators from offering new functionalities and services to consumers, and inhibit service providers from obtaining high-value content. Therefore, even if state regulations of cable set-top boxes were not preempted by federal law – which it is, as explained below – under applicable California law, the Commission should not proceed in considering the adoption of state energy standards for set-top boxes.

III. STATE-IMPOSED STANDARDS COULD UNDERMINE THE EFFICACY OF SET-TOP BOXES AND VIDEO SERVICES

The Commission is required to consider the impact its regulations would have on "product efficacy for the consumer."[31] Rigid or unrealistic state-imposed energy standards for

[29] Press Release, Sen. Dianne Feinstein, Feinstein Applauds Agreement on Energy Efficient Set-Top Boxes (Dec. 6, 2012) ("Last year, I asked the industry to utilize more efficient equipment, and I am very pleased they have taken the first step to accomplish that. I would like to congratulate the 15 companies that joined today's agreement, which will save consumers billions of dollars in reduced electricity bills."); Press Release, Sen. Lisa Murkowski, Murkowski Commends Cable Box Energy Efficiency Agreement (Dec. 6, 2012) ("I commend the industry for proactively developing a consensus agreement that will save their customers money, and not waiting for a federal mandate that forces them to act…. This agreement is a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market."); Press Release, Rep. Ed Markey, Markey: End of Republican War on Energy Efficiency? (Feb. 26, 2013) ("In the rapidly changing telecommunications space, this strong industry-led efficiency agreement can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements."); Press Release, Rep. John Dingell, Dingell Statement Regarding Energy & Power Hearing on Energy Efficient Technologies (Feb. 26, 2013) ("The cable industry is to be commended on this forward thinking to adopt practices that can take effect now and drastically improve efficiency moving forward.").

[30] *See, e.g.*, Voluntary Industry Agreement to Improve the Energy Consumption of Complex Set Top Boxes within the EU Proposal from the Industry Group, Version 3.0 (Sept. 2, 2011) ("EU Voluntary Industry Agreement"); European Council for an Energy Efficient Economy, Lot 18: Complex set top boxes, *available at* http://www.eceee.org/Eco_design/products/complex_set_top_boxes/)**;** Subscription Television Industry, Voluntary Code for Improving the Energy Efficiency of Conditional-Access Set Top Boxes - An Industry Initiative Supported by Government under the National Framework for Energy Efficiency, Version 3, Aug. 2012, *available at* http://www.astra.org.au/Menu/Policy/STV-Set-Top-Boxes.

[31] *See* Cal. Pub. Resources Code § 25402(c)(1) ("When determining cost-effectiveness, the commission shall consider the value of the water or energy saved, impact on product efficacy for the consumer, and the life cycle cost to the consumer of complying with the standard.").

set-top boxes would severely undercut the efficacy of set-top boxes and video services for millions of consumers, not only in California, but nationwide, for many reasons.

A. Inflexible Government Standards Could Not Keep Pace with Rapidly Changing Video Technology

The cable industry has invested more than $200 billion in facilities and equipment since 1996 to build interactive broadband networks that enable operators to update set-top boxes, download new guides and software, and integrate new applications. That investment and innovation throughout the industry have unleashed rapid development of new services and options for consumers and dramatic changes in cable networks and equipment, including set-top boxes.

We explained in Section I above that set-top boxes must operate as part of complex, variable and dynamic networks that evolve rapidly as services evolve. But set-top box design is even more complicated than that. Service providers, who purchase set-top boxes from their suppliers, must deploy equipment that is of reasonable cost but that will not become instantly obsolete. This is a challenging balance, particularly in light of both the dynamism and complexity of the market and evolving consumer demands and expectations. For example, today, there is growing interest in ultra-high resolution (4K) television, but the pace at which such programming might grow is unknown. Nevertheless, if a service provider deploys set-top boxes to consumer homes and retains ownership and financial responsibility for them, the provider may want to add the HEVC video compression standard[32] to the set-top boxes to anticipate and accommodate the greater network compression that will be required to accommodate 4K. Meanwhile, other consumer devices with which set-top boxes interact in the

[32] High Efficiency Video Coding (HEVC) is a video compression standard developed by MPEG and ITU as a successor to H.264/MPEG-4 AVC (Advanced Video Coding).

home, such as tablets, displays, sensors, home networks, also continue to innovate in ways that service providers must try to anticipate and address.

Service providers cannot anticipate every possible innovation in content or consumer devices, but they must have the ability to make rapid and timely judgments about what new features should be included in set-top boxes to anticipate and even help build demand for new products and services, such as 4K. Other features that an operator may wish to add may draw power, yet have no allowance. Examples include wireless connectivity for sensors that allow future home health care services, security, energy management and home automation controls, and gesture or facial-expression detection. Precluding such new features by counting them against an energy usage restriction would erect a formidable barrier to investment and innovation in new products, features, and services.

If the Commission adopts energy standards that do not afford some flexibility and room to innovate, such as by excluding from any usage limits the power drawn by new components or features, providers and manufacturers would instead first have to obtain the permission of the Commission, which would likely require a lengthy rulemaking or waiver proceeding. Consumer choice, investment, and competition would suffer. Effectively requiring a rulemaking or waiver before launching new features or services would stymie not only rapid innovation and the timely introduction of competitive features, but also the effective functioning of video networks altogether. Changes in service provider network equipment and software often require changes to set-top box features, and cable operators need to be able to make timely implementations of those changes to effectively manage their networks.

These examples illustrate that it is critical for video service providers to be able to incorporate new platforms and features into their networks, including their set-top boxes, without

waiting for the regulatory process to catch up. Consumers would lose if MVPDs had to wait months or even years for the completion of a rulemaking or waiver proceeding before they receive the benefits of new services or equipment from MVPDs. Being the "first mover" of a new feature or service is critical to success, and so innovators will not want to reveal the details of new designs to the public through a public proceeding, much less wait months or more for permission to proceed. MVPDs customers would be denied the opportunity they now enjoy to discover new applications and services through their MVPD-supplied set-top boxes.

For these reasons, following the lead of the European voluntary agreement,[33] the Voluntary Agreement sets forth a much better approach by allowing the introduction of new features without the constraint of ill-fitted pre-existing standards. Such features may either be deactivated for testing or otherwise accounted for in order to provide a continued path for rapid innovation.[34] The Voluntary Agreement also affords flexibility for participants to achieve energy efficiency in new ways, by providing credits for "alternative energy efficiency steps which provide energy efficiency gains superior to those required by the Voluntary Agreement."[35]

This approach does not undermine the Voluntary Agreement's energy standards. Many of these new features might never gain wide adoption or use, and therefore would not have a

[33] *See* EU Voluntary Industry Agreement, Version 3.0, Annex C (stating that energy consumption should be measured using base functionalities and that additional features should be disabled unless they have been provided an allowance); Report from the Commission to the European Parliament and the Council on the Voluntary Ecodesign Scheme for Complex Set-Top Boxes (Nov. 22, 2012); U.S. Department of Energy February 27, 2013 Public Meeting on Notice of Proposed Rulemaking on Test Procedure for Set-Top Boxes, Court Reporter Transcript at 86 (Robert Turner of Pace (U.K.) explaining that under the EU agreement, "the test method specifically says, if you have a feature that doesn't have an allowance, you specifically exclude it, disabling it, so you're measuring what you intend to measure, not unintended extras").

[34] *See* Exhibit 1, Voluntary Agreement at § 6.3 ("In order to foster the benefits of such innovative and competitive markets, new features/functions which consume significant power and functions not covered by the ENERGY STAR Version 3.0 STB Program should be deactivated (if possible) during the testing process and are not to be counted against reported efficiency targets. The test results will explicitly list any functions that were deactivated during testing. If it is not possible to deactivate such function for testing, the Signatory may provide written documentation indicating the incremental power consumption of the function to be excluded from the reported test result. Such deactivated/excluded functions may be accounted for in updated applicable energy consumption targets.").

[35] *Id.* at § 12.2.

material impact on national energy consumption in any case. It would have been entirely unnecessary to have suppressed these new features for the purpose of conserving energy since these features may never be used in significant quantity. But consumers would suffer from the derailment even of commercially-unsuccessful features, because technology successes often build upon earlier unsuccessful innovation. Meanwhile, if and when a new feature does become prevalent, the Voluntary Agreement provides for a timely update in standards to assure that the new features are ultimately provided in an overall energy-efficient manner.[36]

Because set-top boxes and video services evolve far more quickly than appliances typically regulated by the Commission, any regulations designed based upon set-top boxes as they exist in 2013 will quickly become outdated. It would be untenable if energy usage regulations resulted in the inability of service providers to include new functionalities or features in set-top boxes until they could secure a waiver or rule change unless the power consumption of the new feature could be squeezed in under the energy usage restrictions that had been designed for set-top boxes lacking such features. Such a result would paralyze innovation and new services, and deprive competitors of any first-mover advantage that so often motivates investment and development. Instead, any regulation should allow, as the Voluntary Agreement does, for the turning off or exclusion of new features or functionalities when testing set-top boxes against a standard.

Government regulation of complex, rapidly-evolving technology is especially prone to the risk of unintended consequences. The cable industry has suffered such consequences before from a set-top box regulation. Since July 2007, cable operators have been required by the FCC's "integration ban" to include a separate security module, called a CableCARD, in each new leased

[36] *See id*. at §§ 6.3, 10.1.

set-top box that they place into service, in the same way that CableCARDs are used in some retail devices.[37] Cable operators vigorously objected to this unnecessary rule as inefficient, because redesigning leased set-top boxes added cost but no functionality to the device. CableCARDs consume power, require additional heat dissipation, and operate even when they are not actively decrypting video content because they must constantly process network messages and updates. Given the EPA allowance for CableCARDs of 15 kWh, the 40 million CableCARDs that cable operators have deployed inside their leased set-top boxes waste more than 500 million kWh/year. This FCC rule adversely impacted innovation and energy conservation, such as by delaying the deployment of energy-efficient DTAs for nearly two years. The cable industry and its vendors had to go through an arduous waiver process and then a rulemaking process to change the rule merely to allow the deployment of low-wattage DTAs, but the rule remains on the FCC's books for other set-top boxes.

The sobering lesson from this experience is that government regulation of set-top boxes can have significant unintended and unforeseeable consequences on future innovation in the video marketplace. The Commission should guard against a similar mistake here.

B. Rules that Undermine Content Protection Functionality Would Jeopardize Consumer Access to High-Value Content

Under the product "efficacy" requirement of the Act, the Commission must also recognize that set-top boxes must be designed to be compatible with conditional access and content protection technologies that are demanded by content owners, including the California entertainment industry. Content suppliers license their content for distribution on MVPD platforms through complex and variable private bilateral affiliation agreements that, among other things, define required content protection measures and restrictions on the types of devices that

[37] 47 C.F.R. § 1204(a)(1) (second sentence).

can receive the content. A content provider may be willing to make programming available to MVPDs or others based on distribution paths and security particular to that distributor. If a particular distributor does not agree or cannot deliver terms sought by the content owner, the content owner can refuse to provide content to that distributor and rely instead on alternative distributors, such as competing MVPDs or over-the-top platforms.

The terms of these affiliation agreements impact an MVPD's choices regarding the devices to use in customers' homes. For example, several cable operators recently began to enable their customers to watch content on iPads within their home without an additional set-top box, and plan to make that function available to additional devices in the near future. However, one of the largest content owners, Viacom, sued to stop the practice, alleging that the parties' affiliation agreement did not permit this arrangement.[38] Similarly, Cablevision was sued by numerous content providers when it launched a "remote storage" DVR ("RS-DVR"), which allowed customers to obtain DVR functionality through the network without having a physical DVR present in their home. Cablevision prevailed in its case, but the U.S. Solicitor General anticipates more litigation around such technologies.[39]

These legal and technical considerations help explain why set-top boxes are part of complex distribution systems that enforce rights in content and distribution, and that is subject to

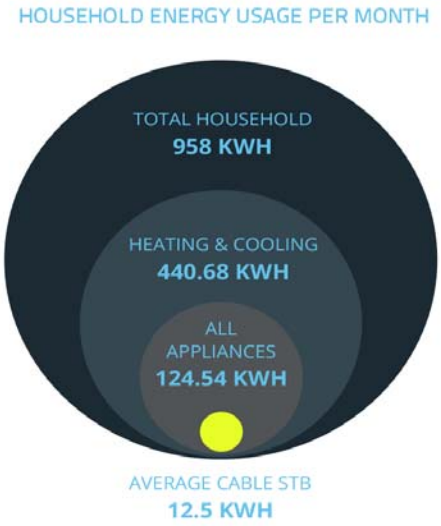
[38] *See, e.g., Viacom International, Inc. v. Time Warner Cable*, No. 11-civ-2387 (S.D.N.Y. filed Apr. 7, 2011).

[39] A federal district court ruled that Cablevision's RS-DVR was not authorized by its agreements and thus violated the Copyright Act as infringement. *Twentieth Century Fox Film Corp. v. Cablevision Systems Corp.*, 478 F.Supp.2d 607 (S.D.N.Y. 2007). The Second Circuit Court of Appeals reversed that decision, but it did so on only some of the potential claims. *Cartoon Network LP v. CSC Holdings, Inc.*, 536 F.3d 121 (2nd Cir. 2008). The Solicitor General recommended that more litigation play out across the Circuits, rather than have the Supreme Court take the case. *See* Solicitor General Brief on RS-DVR, http://www.scribd.com/doc/15932800/Solicitor-General-Brief-on-RSDVR ("The Second Circuit's decision, however, is unlikely to be the last appellate ruling to address these issues."). Since then, New York federal courts have refused to enjoin the carriage of broadcast signals over the Internet, *ABC v. Aereo, Inc.*, 874 F. Supp. 2d 373 (S.D.N.Y. 2012), *aff'd, WNET v. Aereo, Inc.*, 2013 U.S. App. LEXIS 6578 (2d Cir. 2013), but California courts have enjoined Internet delivery of both recorded and broadcast signals *Warner Bros. Entm't Inc. v. WTV Sys., Inc.*, 824 F. Supp. 2d 1003 (C.D. Cal. Aug. 1, 2011); *Fox v. Aereokiller*, Case No. CV12-6921-GW-JC, Order (C.D. Cal. Dec. 27, 2012) (order granting preliminary injunction).

a pervasive federal regulatory and legal regime not suitable for varied state regulation (as described in more detail in Section IV below). These same factors affect and limit the ability to redesign set-top boxes for energy efficiency, and preclude the imposition of a one-size-fits all prescription for set-top boxes.

C. The Risks of State Regulation are Outweighed by its Minimal Potential Benefits

The Warren-Alquist Act requires the Commission to undertake a cost-benefit analysis prior to adoption of any energy standard.[40] Under this balancing approach, there is no compelling case to risk the potential harms that could arise from state regulation of set-top boxes. The total energy in use by set-top boxes is dwarfed by virtually everything else in the home, such as heating, air conditioning, and appliances:[41]



[40] Cal. Pub. Resources Code § 25402(c)(1).

[41] Household energy use from U.S. Energy Information Administration, *Frequently Asked Questions: How much electricity does an American home use?*, *available at* http://205.254.135.24/tools/faqs/faq.cfm?id=97&t=3 (total 2010 household electricity use average of 958 kWh per month 2010); U.S. Energy Information Administration, *Table 5.3. Average Retail Price of Electricity to Ultimate Customers: Total by End-Use Sector, 1997 through December 2011*, *available at* http://205.254.135.24/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_3 (average 2010 electricity cost 11.54 cents per kWh); ENERGY STAR, *Save Energy at Home, Energy Use*, *available at* http://www.energystar.gov/index.cfm?c=products.pr_save_energy_at_home (heating and cooling accounting for 46% of total household use); Bryan Urban, Verena Tiefenbeck & Kurt Roth, *Energy Consumption of Consumer Electronics in U.S. Homes in 2010, Final Report to the Consumer Electronics Association (CEA)*, Fraunhofer Center for Sustainable Energy Systems at 90 (Dec. 2011), *available at* http://www.ce.org/PDF/Energy-Consumption-of-CE-inUSHomes-2010.pdf ("2011 CEA Report") (Average cable set-top box energy use circa 2010: 150 kWh/yr).

The small share of energy consumption is declining even further with the substantial energy savings that are already secured by the Voluntary Agreement and the proliferation of energy-efficient DTA. In 2011, NRDC was circulating a claim that set-top boxes consume more than the standard ENERGY STAR refrigerator.[42] It based that claim on what it called a "typical home" with one high definition DVR and one high definition set-top box. Some newspaper headlines erroneously summed up the report as saying that each set-top box consumed more than a refrigerator. All of these claims are incorrect. Even if left on all the time, one current model HD DVR plus one HD set-top box would not come close to a refrigerator. A standard ENERGY STAR refrigerator consumes 2.5 times the amount of energy consumed by a current model DVR, and set-top boxes have been increasing in energy efficiency far more rapidly than refrigerators.

MVPD set-top boxes also compare quite favorably in energy consumption to the many other forms of video systems, which continue to offer more and more content in competition with MVPD services. The number of alternative video platform devices is climbing dramatically, and they now exceed 200 million.[43] These over-the-top (OTT) and other

[42] Natural Resources Defense Council, Better Viewing, Lower Energy Bills, and Less Pollution: Improving the Efficiency of Television Set-Top Boxes (June 2011).

[43] *See*:

- PlayStation 3: 23.60 million. *See* USA Yearly Chart (2012), VGChartz.com, *available at* http://www.vgchartz.com/yearly/2012/USA/ (ranking top-selling game consoles in 2012 and listing all-time sales totals for each in "USA Hardware by Platform" chart on sidebar) ("*VGChartz.com List*").
- PlayStation 2: 23 million. The previous-generation PlayStation 2 console, which still enjoyed a 20% penetration rate among U.S. households as recently as one year ago, can play Internet video via third-party software. *See* Richard Lawler, *Qtv Launches Console IPTV Platform on the PlayStation…2*, Engadget.com, Apr. 21, 2009, *available at* http://www.engadget.com/2009/04/21/qtv-launches-console-iptv-platform-on-the-playstation-2/; U.S. Gaming: A 360º View, Nielson.com, Feb. 7, 2012, at 5, *available at* http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2012-Webinars/US-Gaming-A-360-View.pdf (listing PlayStation 2 with 20% penetration of U.S. households). Based on U.S. Census QuickFacts data that there are approximately 114.76 million U.S. households, Nielson's 20% penetration rate works out to approximately 23 million active units.
- Xbox 360: 38.49 million. *See VGChartz.com List.*
- Nintendo Wii: 40.65 million. *See VGChartz.com List.*

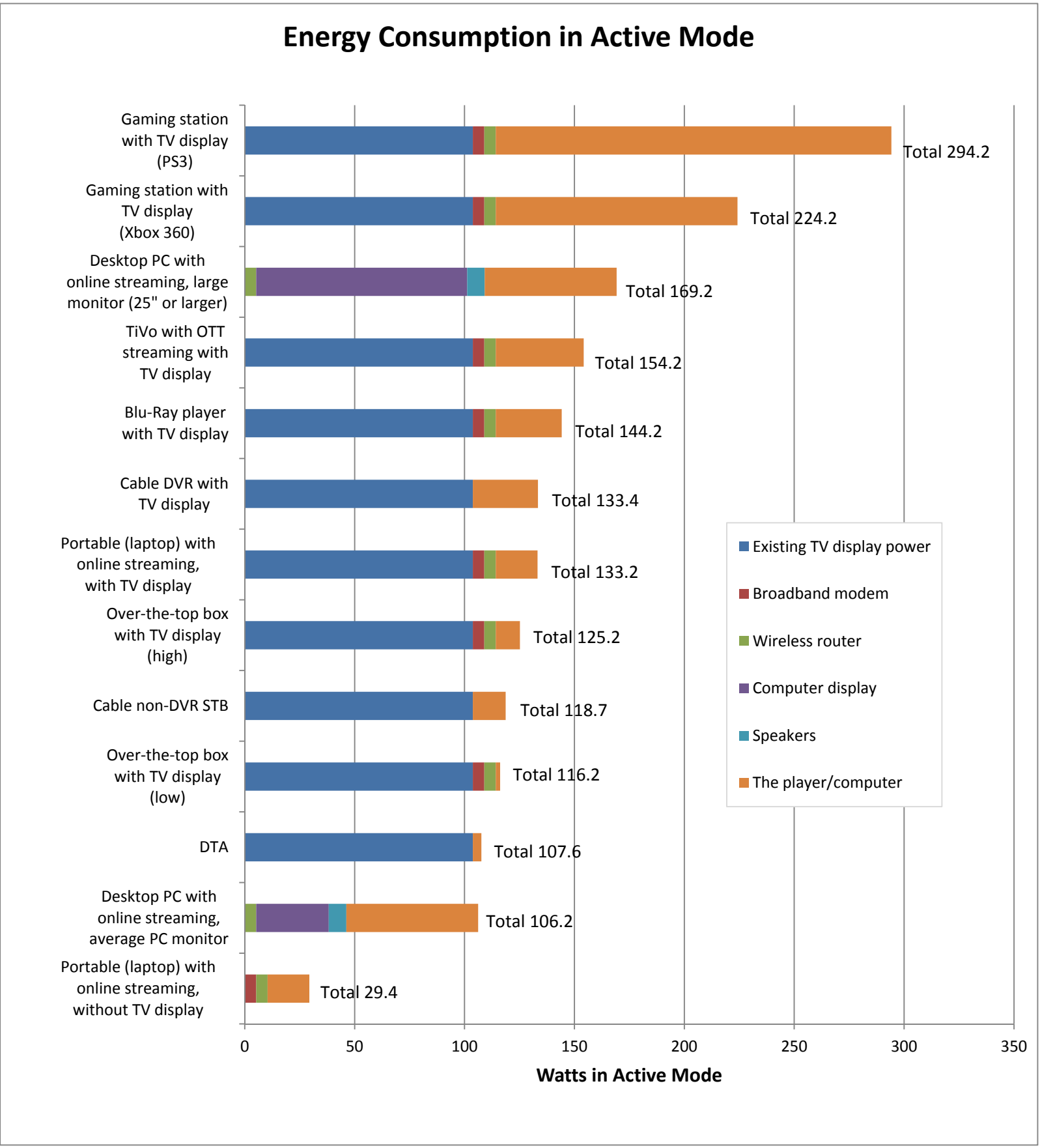
alternative devices rely on other power-consuming devices within the home, such as broadband modems, wireless routers, computers, and external speakers. When all of the components for viewing are included, some OTT devices use more power, even several times more power, than a typical cable set-top box. For example, a consumer watching video on a broadband-enabled Sony PlayStation 3 game console consumes 294 watts: 180 watts for the game console, 5 watts for the broadband modem, 5 watts for a wireless router, and 104 watts for the average television.[44] This compares to 134 watts using a cable DVR and average TV (29.6+104), and 119 watts using a cable HD non-DVR and TV (14.9+104).[45] A comparison of cable set-top boxes to various OTT options is provided in the following table:[46]

- Blu-ray players: Approximately 51 million. *See* News Release, DEG's Year-End 2012 Home Entertainment Report, Digital Entertainment Group (Jan. 8, 2013), *available at* http://degonline.org/pressreleases/2013/Year_End_2012%20cover%20note_FINAL_1.8.13.pdf.
- SmartTVs: 15.8 million. *See* Press Release, One Hundred Million Smart TVs Now In Use Worldwide, StrategyAnalytics.com, Jan. 3, 2013, *available at* http://www.strategyanalytics.com/default.aspx?mod=pressreleaseviewer&a0=5311 (listing United States with 15.8 million units in chart titled, "Smart TV Installed Base Forecast: Selected Countries in 2012," based on December 2012 study by Strategy Analytics).
- Desktop computers: 100+ million. *See* 2011 CEA Report at 30.

[44] 2011 CEA Report at 106 (PS3 playing HD: 148-180w), 70 (broadband modem: 5.2w; wireless router: 5.2w).

[45] *Id.* at 90 (Cable non-DVR set-top box: 14.9w average in active mode; Cable DVR: 29.6 W average in active mode), 97 (Television: varies widely by display technology, screen size, and year of manufacture. The average TV is 29.1" diagonal and 6.2 years old. The average primary TV is larger, at 38" diagonal, and used more frequently than older, smaller ones.), 101 (The average TV uses 103.8 W in active mode. The average primary TV uses 133 W in active mode.). A typical 2011 DTA uses 3.85 W in active mode. *See* U.S. Department of Energy, *Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Proposed Determination of Set-Top Boxes and Network Equipment as a Covered Consumer Product*, Proposed Determination, Comments of NCTA (filed Sept. 30, 2011) at 3.

[46] 2011 CEA Report at 87 (TiVo: 27-40w), 28 (Blu-Ray: active mode 30w), 31 (desktop computer: active mode 60w), 39 (portable computer: active mode 19w), 48 (average two-speaker system: 8w), 106 (average 18 inch computer display: 33w in active mode; Xbox 360 playing HD: 110-126w). Apple TV reports 2.08w streaming HD. *See* http://www.apple.com/environment/reports/docs/AppleTV_Product_Environmental_Report_20110323.pdf. Roku advertises less than 2w when streaming video. *See* http://www.roku.com/rokuproducts. A consumer reported Boxee using 11w when streaming video at http://forums.boxee.tv/showthread.php?t=22177.



Source: 2011 CEA Report and other sources. See footnotes 44-46.

Thus, MVPD set-top boxes use only a small share of power in the home and, under the savings secured by the Voluntary Agreement, a declining share of the energy used for the viewing of video by consumers. Given that the potential costs of regulation outweigh the small if any, benefits, the Commission should decline to impose standards or other regulations on set-top boxes.

IV. STATE REGULATION OF CABLE SET-TOP BOX ENERGY EFFICIENCY IS PREEMPTED BY FEDERAL LAW

Federal law preempts states from adopting technical standards related to cable set-top boxes. In September 2004, after considering the adoption of appliance efficiency standards for set-top boxes in Docket 03-AAER-1, the Commission, in the face of arguments that the State of California was federally preempted from adopting such state-specific standards, excluded set-top boxes from further consideration. The Commission should likewise exclude cable set-top boxes from its current rulemaking.

The federal Cable Act expressly preempts and supersedes inconsistent state or local law,[47] but certain provisions go much further. In 1992, the Cable Act was amended to remove a provision that once authorized consistent state and local regulation of cable systems' technical operation. In place of that provision, Congress replaced it with an express proviso that no state or local authority may prohibit, condition or restrict a cable system's use of any type of subscriber equipment. Specifically, Section 624(e) of the Act, as amended, provides:

> **Technical Standards:** Within one year after October 5, 1992, the Commission shall prescribe regulations which establish minimum technical standards relating to cable systems' technical operation and signal quality. The Commission shall update such standards periodically to reflect improvements in technology. *No state or franchising authority may prohibit, condition or restrict a cable*

[47] *See* 47 U.S.C. § 556(c).

> *system's use of any type of subscriber equipment or any transmission technology.*[48]

The FCC has made it abundantly clear that Section 624(e) precludes local franchising authorities and states from regulating in the areas of technical standards, customer equipment and transmission technologies.[49] And before this provision was added, the Supreme Court succinctly explained why the FCC must have the authority to preempt state and local technical standards for cable systems. In *City of New York v. FCC*, 486 U.S. 57 (1988), the Court quoted with approval FCC findings that:

- "[A] multiplicity of mandatory and nonuniform technical requirements undermined 'the ultimate workability of the over-all system,' and could 'seriously imped[e]' the 'development and marketing of signal source, transmission, and terminal equipment.'"[50]
- "Technical standards that vary from community to community create potentially serious negative consequences for cable system operators and cable consumers in terms of the cost of service and the ability of the industry to respond to technological changes."[51]

Set-top boxes must be manufactured to be in compliance with the FCC's technical standards, as set forth in Part 76, Subpart K of the FCC's Rules. The FCC adopted these rules, which deal generally with transmission and signal parameters and signal quality, to give cable providers and set-top box manufacturers the flexibility they need to rapidly implement innovative technologies in a national (and international) marketplace for video services. The FCC's technical standards do not prescribe specific power consumption levels for set-top boxes. To date, the FCC has left energy efficiency issues to voluntary ENERGY STAR set-top box

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[48] 47 U.S.C. § 544(e) (emphasis added).

[49] *Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996*, Report and Order, CS Docket No. 96-85, 14 FCC Rcd. 5296 at ¶¶ 131-32 ("*Cable Act Reform Order*").

[50] *City of New York v. FCC*, 486 U.S. 57, 60 (1988) (quoting *Cable Television Report and Order*, 49 F.C.C.2d 470, 478-79 (1974)).

[51] *Id.* at 65 (quoting *Review of the Technical and Operational Requirements of Part 76, Cable Television*, Report and Order, MM Docket No. 85-38, 59 RR2d 569, 50 Fed. Reg. 52462 (1985)).

specifications promoted by the U.S. Department of Energy and the U.S. Environmental Protection Agency. Because the Act does not permit state or local regulation of technical standards, any mandatory restriction on energy consumption adopted by a state would be an impermissible technical "restriction" on a cable operator's use of set-top boxes.[52]

The legislative history leaves no doubt about the extent or purpose of the prohibition in Section 624(e). Congress was particularly concerned that inconsistent local regulation would impede technological development: "The Committee intends by this subsection to avoid the effects of disjointed local regulation. The Committee finds that the patchwork of regulations that would result from a locality-by-locality approach is particularly inappropriate in today's intensely dynamic technological environment."[53] Likewise, in the *Cable Act Reform Order*, the FCC stated, "uniformity of technical standards … is essential to prevent the inefficiency and confusion that threatened the cable industry during the period when local authorities … could set stricter standards than those promulgated by the Commission."[54]

Preemption is as important today as when it was first adopted to protect the field for rapid innovation. Large national cable providers like Comcast, Time Warner Cable, Cox and Charter offer services across wide swaths of the country. To do so, these companies utilize warehouses to supply multi-state regions with necessary equipment. Cable operators acquire set-top boxes in volume on a nationwide basis to achieve economies of scale and scope that can facilitate greater innovation and investment. Cable operators develop technical designs, firmware and software updates, and new applications through centralized research and development on a national level.

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[52] *See* 47 U.S.C. § 544(e).

[53] *See* H.R. Rep. No. 104-204, at 110 (1995).

[54] *Cable Act Reform Order* at ¶ 127 (citing *Competition, Rate Deregulation and the Commission's Policies Relating to the Provision of Cable Television Service*, Report, MM Docket No. 89-600, 5 FCC Rcd 4962, 5056 (1990)).

In 2011, the FCC preempted a claim brought under California law when a cable operator changed the particular program offered in one of its program packages.[55] The Commission explained that federal preemption is intended to prevent the application of more restrictive rules that can thwart the rapid introduction of new services in a dynamically changing marketplace.[56] Today, the FCC is engaged in an open rulemaking on cable technical standards, including the network-CPE (customer premises equipment) relationship and interface.[57] State regulation is inappropriate and ill-suited for cable technical standards in general, and States are expressly preempted from imposing any condition or restriction on any type of cable subscriber equipment, including set-top boxes.

For all of these reasons, any attempt by the Commission to regulate technical standards governing cable operator set-top boxes is preempted by federal law. Efforts to apply California-specific technical standards to cable set-top boxes would create precisely the inefficiency and confusion Congress and the FCC have endeavored to avoid, and would undermine the national equipment market which has long been required for cable television equipment.

V. CONCLUSION

For the reasons stated herein, the Commission should stand down from consideration of imposing any regulations on cable operator set-top boxes. The Voluntary Agreement is already securing the energy savings sought by the IOUs at the inception of the Commission's current investigation. The Voluntary Agreement can adapt quickly and flexibly to changes in technology and the market to seize new opportunities for energy efficiency, while avoiding the

[55] *Petition for a Declaratory Ruling Regarding Negative Option Billing Restrictions of Section 623(f) of the Communications Act and the FCC's Rules and Policies*, Declaratory Ruling, MB Docket No. 10-215, 26 FCC Rcd 2229 ¶ 13 (MB Mar. 1, 2011).

[56] *Id*. at ¶ 5.

[57] *See Cable Television Technical and Operational Requirements*, Notice of Proposed Rulemaking, MB Docket No. 12-217, 27 FCC Rcd 9678 (2012).

many risks of state government intervention: erosion of the consumer benefits from rapid innovation, reduction in the efficacy of video devices and services, suppression of new services and competition, and fractured and inconsistent state rules that hobble the continued development of an efficient market for set-top boxes.

The industry is already meeting regularly to update energy efficiency measures as the technology advances and in consultation with government agencies and energy efficiency advocates. CCTA and NCTA welcome the views of the Commission, the IOUs, and other parties as we develop further phases of the Voluntary Agreement continued improvements to energy efficiency for the benefit of California consumers. As a matter of sound policy and adherence to the Warren-Alquist Act, given that the industry is already committed to saving consumers billions of dollars in electricity more quickly and effectively than regulatory approaches, the Commission and consumers have far more to gain – in immediate energy savings, innovation, and competition – than to lose by withdrawing set-top boxes from this proceeding. In any event, as a matter of federal law, state regulation of cable set-top boxes is preempted by the Cable Act.

Respectfully submitted,

/s/ Lesla Lehtonen

Lesla Lehtonen, Sr. VP, General Counsel
CALIFORNIA CABLE & TELECOMMUNICATIONS ASSOCIATION
1001 K Street, 2nd Floor
Sacramento, CA 95814

Paul Glist, Counsel to CCTA and NCTA
Davis Wright Tremaine LLP
1919 Pennsylvania Avenue N.W., Suite 800
Washington, DC 20006-3401

/s/ Neal M. Goldberg

Rick Chessen, Sr. VP, Law & Regulatory Policy
Neal M. Goldberg, VP, General Counsel
William A. Check, Ph.D., Sr. VP, Science & Technology and Chief Technology Officer
Andy Scott, VP, Engineering
Jim Partridge, VP, Industry & Technical Analysis
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 Massachusetts Avenue, N.W. – Suite 100
Washington, DC 20001-1431

May 9, 2013

Exhibit 1

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

VOLUNTARY AGREEMENT
FOR ONGOING IMPROVEMENT TO THE ENERGY EFFICIENCY OF SET-TOP BOXES

December 6, 2012

This document sets out a Voluntary Agreement between the undersigned Signatories to continue improvements in the energy efficiency of Set-Top Boxes used in the distribution of digital video signals. The Annexes 1-9 attached hereto form part of the Voluntary Agreement.

1. Purpose

1.1. The purpose of this Voluntary Agreement is to continue improvements in the energy efficiency of Set-Top Boxes used in the delivery of services by Service Providers, thereby further reducing potential environmental impact and increasing benefits to consumers. Fostering device and service functionality while encouraging innovation and competition by Service Providers and Manufacturers are equally important objectives of this Voluntary Agreement.

1.2. Energy efficiency improvements will be pursued provided that such improvements do not jeopardize the intended uses and functionalities of Set-Top Boxes; that they preserve or enhance the customer experience; and that they are sufficiently flexible to adapt to technological options and market competition, to improve functionality, to offer service enhancements, and to foster rapid innovation.

1.3. The Voluntary Agreement is intended to be a complete and adequate substitute for all Federal and State legislative and regulatory solutions. The Signatories agree that voluntary measures including industry self-regulation are the preferred means for addressing the energy consumption of complex, networked, digital video service set-top boxes that are generally owned by the Service Provider and integrated with distribution networks, but deployed within the premises of customers.

1.4. The Signatories agree that energy efficiency measures should not create undue burdens or competitive disadvantages for Service Provider Signatories compared with other means of distributing video programming and other programming services.

1.5. Nothing in this Voluntary Agreement shall preclude any party from implementing energy efficiency measures that exceed the requirements of this Agreement.

2. Equipment Covered

2.1. This Voluntary Agreement initially covers only new Set-Top Boxes, as defined in Annex 1, ordered and placed into service in the United States by a Service Provider Signatory after the Effective Date. Except as specifically set forth in the Annexes 3-5 applicable to specific industry groups of Service Providers, there is no retroactive effect on equipment that is deployed or in inventory prior to the Effective Date, nor is there any requirement to retire or change existing equipment or to change existing equipment that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed.

2.2. Pursuant to the procedures of Section 11, during calendar year 2013 the Steering Committee will discuss amendments to this Voluntary Agreement that might be adopted to apply to future devices used by Service Providers for the delivery of commercial video services to consumers, such as residential modems and routers and Multi-Service Gateways.

3. Service Provider Signatory Commitments for Set-Top Boxes

3.1. From the Effective Date:

3.1.1. Service Provider Signatories, through their purchasing, will support and encourage the development of new Set-Top Boxes designed to minimize energy consumption as

specified below while achieving the operational specifications, preserving their intended uses and functionalities, permitting ongoing innovation, preserving and enhancing the customer experience, and complying with existing applicable regulation.

3.1.2. Ninety percent (90%) of all new Set-Top Boxes that a Service Provider Signatory purchases and deploys after December 31, 2013 shall meet the efficiency standards established for ENERGY STAR Version 3.0 devices as of the Effective Date.

3.1.3. A Service Provider Signatory shall also comply with such specific energy efficiency provisions as are set forth in the Annex specifically accepted by the Service Provider when it becomes a Signatory.

3.2. Service Provider Signatories will support:

3.2.1. reasonable steps to monitor the effectiveness of this Voluntary Agreement through the procedure described in Section 10;

3.2.2. periodic review of the Voluntary Agreement to consider amendment to the Voluntary Agreement through the procedure described in Section 11; and

3.2.3. reasonable steps to inform consumers about the general energy consumption characteristics and performance of Set-Top Boxes, as described in Section 7.5.

4. Signatories to the Voluntary Agreement

4.1. Service Providers may become Signatories by signing Annex 7, Part A.

4.2. Equipment Manufacturers, Component Manufacturers, Software Providers, and Conditional Access Providers may become Vendor Signatories to the Voluntary Agreement by signing Annex 7, Part B. Each such Vendor Signatory endorses the purposes of the Voluntary Agreement and agrees to its commitments set out herein.

4.3. Each Signatory commits only to the areas which are under its individual control and responsibility.

4.4. After the Effective Date, qualified additional parties may become Signatories upon the approval of the Steering Committee, which shall not be unreasonably withheld.

5. Vendor Signatory Commitments for Set-top Boxes

5.1. Component Manufacturers will use reasonable efforts to design Set-Top Box components which improve functionality and enable component sub-systems to be controlled and operated in an energy efficient manner.

5.2. Conditional Access Providers will use reasonable efforts to design and develop conditional access systems which enable improved Set-Top Box energy efficiency while meeting the functional and operational specifications of Service Providers.

5.3. Equipment Manufacturers will use reasonable efforts to design and manufacture equipment to enable improved Set-Top Box energy efficiency while meeting the Service Providers' functional and operational specifications.

5.4. Software Providers will use reasonable efforts to develop software power management applications that are consistent with the commitments made by Service Providers for Set-Top Boxes and that enable Service Providers to utilize and integrate hardware power management features offered by Equipment Manufacturers and to do so without negatively impacting other Set-Top Box features and functionality or adversely affecting the End User customer experience.

6. Test Method

6.1. The applicable test methodologies and procedures are fully described within this document or incorporated by reference to external methodologies and/or procedures. Clarification of referenced methodologies or procedures may be provided in Annex 6 to avoid ambiguity. Compliance with the applicable energy consumption targets for Section 3.1.2 shall be demonstrated using tests defined in or reasonably consistent with the EPA ENERGY STAR Version 3.0 STB Testing Program.

6.2. The energy efficiency of Set-Top Boxes will be tested as normally installed for the End User as is specified in the ENERGY STAR Version 3.0 STB Program. Tests must be conducted using an EPA-Recognized Laboratory listed at the ENERGY STAR web site <http://www.energystar.gov/index.cfm?c=third_party_certification.tpc_index> or new test facilities which are pre-approved as test facilities for specific technologies as set forth in Annexes 3-5. Set-Top Boxes that have already been tested and appear on the ENERGY STAR Qualified Product List as meeting the efficiency standards for ENERGY STAR Version 3.0 devices need not be re-tested under this Voluntary Agreement, but shall be included in annual reports required by Section 7.1.

6.3. The Signatories agree that Equipment Manufacturers, Service Providers, Software Providers, Conditional Access Providers and Component Manufacturers are constantly innovating their products in response to developments in service concepts and technologies, competition, and consumer demand. In order to foster the benefits of such innovative and competitive markets, new features/functions which consume significant power and functions not covered by the ENERGY STAR Version 3.0 STB Program should be deactivated (if possible) during the testing process and are not to be counted against reported efficiency targets. The test results will explicitly list any functions that were deactivated during testing. If it is not possible to deactivate such function for testing, the Signatory may provide written documentation indicating the incremental power consumption of the function to be excluded from the reported test result. Such deactivated/excluded functions may be accounted for in updated applicable energy consumption targets.

7. Reporting

7.1. Each Service Provider Signatory shall prepare a confidential annual report by April 1 of each year commencing in 2014 containing the data set out in Annex 2 for the prior Reporting Period during which it was a Signatory and submit the report to the Independent Administrator or to an aggregating entity as set forth in Section 7.3 below.

7.2. A Reporting Period covers a single calendar year. When a Service Provider Signatory is making its first report, it may provide data either for the entire prior calendar year (effectively backdating its commitment to the January 1 preceding its signature) or provide a report covering only the period beginning with its signature.

7.3. Service Provider Signatories may elect to submit reports to a recognized industry consortium or industry association for aggregation and anonymization prior to forwarding to the Independent Administrator for final aggregation and reporting, provided that individual records are retained for purposes of audit.

7.4. All reporting arrangements shall protect the confidentiality of commercially sensitive information. The Independent Administrator must sign a confidentiality agreement in relation to any confidential information supplied by the Signatories.

7.5. Service Provider Signatories shall provide their subscribers and potential customers with reasonable access to energy efficiency information about the Set-Top Boxes subject to this

Voluntary Agreement no later than January 1, 2014 (or six months after signature, if later). This information may be reported in broad averaged categories, such as for DVRs, Non-DVRs, and Thin Clients offered by a Service Provider Signatory.

7.6. The Independent Administrator will aggregate and compile the confidential data submitted by Signatories and submit a report to the Steering Committee for each Reporting Period. To preserve confidentiality, any such official report produced by the Independent Administrator in connection with the information supplied by any individual Signatory shall not refer to the performance of individual Signatories.

8. Audit and Verification

8.1. On request of the Steering Committee, the Independent Administrator shall instruct an independent auditor approved by the Steering Committee to conduct an audit of the information and test results supplied by any Service Provider Signatory's Annex 2 annual report, provided that data which is also submitted to ENERGY STAR may not be subject to an audit other than one initiated by ENERGY STAR. Commercially sensitive information with respect to an individual Signatory, as designated by that Signatory, shall remain confidential both during and after the audit. Signatories agree to provide reasonable assistance to the auditor. The independent auditor must sign a confidentiality agreement in a form reasonably satisfactory to the Signatory. The Steering Committee shall bear the cost of such audit.

8.2. The Independent Administrator shall arrange for field verification of Set-Top Box energy consumption as follows.

8.2.1. Verification will test only Set-Top Boxes on various Service Provider networks in no more than 100 homes annually. The Steering Committee shall determine the scope and sampling methodology (including limitations on the frequency with which any particular Service Provider Signatory is subject to field verification), verification protocols, verification dispute resolution procedures and reporting format, and the means for protecting the confidentiality of data collected during verification. The verification process shall not inconvenience customers.

8.2.2. The cost of field verification shall be assessed equitably by the Steering Committee among the Signatories, separate from the dues established under Section 9. Costs of field verification shall not be imposed entirely upon the Vendor Signatories.

8.2.3. Service Provider Signatories or their designees will identify candidate homes/customers utilizing the Set-Top Boxes subject to field verification. The field verification will not be identified as being sponsored or endorsed by the Service Provider Signatory without the consent of the Service Provider Signatory.

8.2.4. Issues identified during field verification may be submitted for discussion with the relevant Service Provider Signatory and/or by the Steering Committee. Substantial non-compliance identified from field verification may be submitted as a claim for resolution under Section 12.3 through 12.5.

8.2.5. The Steering Committee may utilize alternative methods of verification which may not necessitate in-home verification.

8.2.6. Field verification shall take place either every other year of operation under this Voluntary Agreement or at other times as deemed appropriate by the Steering Committee.

9. Steering Committee

9.1. A Steering Committee is established as the coordinating and governing body of this Voluntary Agreement.

9.2. Each Service Provider Signatory with more than two million U.S. residential multichannel video subscribers as of its date of execution of this Voluntary Agreement, or which is one of the three largest telephone providers of U.S. residential multichannel video services, may nominate one person to represent it as a Member on the Steering Committee.

9.3. The Vendor Signatories in Annex 7, Part B together may nominate no more than three persons to serve as Members of the Steering Committee. A representative of the Consumer Electronics Association shall serve as one such Member. No Signatory may be represented twice.

9.4. A representative of the National Cable & Telecommunications Association shall serve as a Member.

9.5. Signatories entitled to nominate a Member may appoint an alternate representative that may attend meetings and vote in the absence of that Member. Signatories may replace a Member or alternative representative on notice.

9.6. The Steering Committee will elect a Chair from among its Members.

9.7. The Chair will be responsible for convening the Steering Committee meetings at least once each calendar year, and for running meetings of the Steering Committee.

9.8. At the request of any Signatory, the Chair may authorize any person to attend meetings of the Steering Committee as non-voting observers.

9.9. Attendees at Steering Committee meetings shall sign a confidentiality agreement as a condition of attendance.

9.10. The Steering Committee may adopt rules of procedure and administration. At a minimum, such rules will provide that all Members will be provided with at least fifteen (15) days' prior written notice of meetings of the Steering Committee or any sub-committee or any other groups acting in accordance with this Voluntary Agreement, that an agenda will be circulated sufficiently before the meeting to be reviewed by counsel, that no substantive vote will occur unless the subject of the vote was included in such prior notice, and that written minutes as to all topics of discussion be recorded, approved by all committee Members, and retained.

9.11. The Steering Committee may adopt rules for reporting, verification, and audit, which may be informed by existing ENERGY STAR procedures. These rules may include specific procedures for Service Providers to use in documenting deactivated functions or excluding the power consumed by functions not covered by the ENERGY STAR Version 3.0 STB Program, as set forth in Section 6.3.

9.12. The Steering Committee may delegate any of its powers under the Voluntary Agreement to specific individuals or to sub-committees established by the Steering Committee.

9.13. The Steering Committee shall designate an Independent Administrator to be responsible for the collection and processing of information supplied directly or indirectly by Signatories and determining a Signatory's compliance with the Voluntary Agreement.

9.14. The costs of attending Steering Committee meetings will be borne by each attendee.

9.15. The costs of operating the Steering Committee shall be allocated in cost-recovery only annual dues set by the Steering Committee and assessed equally on each Signatory. The initial amount shall not exceed $10,000 per Signatory annually.

9.16. The Steering Committee will seek regular consultation and engagement with the official representatives of the Department of Energy, the Environmental Protection Agency, appropriate state regulatory authorities, and other stakeholders such as energy conservation advocates to provide updates regarding the implementation of this Agreement.

10. Review of the Voluntary Agreement

10.1. Annual Review

10.1.1. At least once each calendar year the Steering Committee will meet to review the Voluntary Agreement in order to:

10.1.1.1. evaluate the effectiveness of the Voluntary Agreement in achieving its purposes as identified in Section 1 above;

10.1.1.2. create an annual report consistent with Annex 8;

10.1.1.3. evaluate current and future developments that may influence energy consumption with a view to agreeing upon a course of action and/or revising the Voluntary Agreement; and

10.1.1.4. set future targets to increase energy efficiencies in accordance with the usual product development cycles.

10.1.2. Such discussions shall take place on a confidential basis.

10.2. Interim Consultations

10.2.1. During the first year of operation under this Voluntary Agreement, the Steering Committee shall meet at least quarterly at a mutually agreed upon time and place to review progress towards applicable targets and any significant issues discovered which are likely to affect meeting such targets.

10.2.2. During subsequent years of operation under this Voluntary Agreement, the Steering Committee may hold periodic meetings on a mutually agreeable timetable.

11. Amendment of the Voluntary Agreement

11.1. The Voluntary Agreement may be amended in accordance with Section 10 and in accordance with the procedure set out in this Section 11. The Steering Committee will consult on proposed amendments to the Voluntary Agreement prior to any vote on an amendment.

11.2. The Members of the Steering Committee will negotiate in good faith when considering amendments to the Voluntary Agreement.

11.3. The Chair of the Steering Committee will call for a vote to be made by a subsequent meeting of the Steering Committee. All Members will be notified of the details of the next meeting, the proposed amendment(s) and the calling of a vote in accordance with the notice provisions of Section 9.10.

11.4. At the next meeting of the Steering Committee, each proposed amendment will be adopted if there is at least agreement of two-thirds of the Service Provider Members, and the two thirds includes at least one Member of each of the three industry groups of Service Providers (cable, satellite, and telephone) covered by the Voluntary Agreement. The telephone companies that sign either Annex 4A or 4B are together deemed to be one industry group for purposes of voting requirements in this Section 11.4.

11.5. An industry-specific Annex may only be amended by agreement of two-thirds of the Service Provider Members covered by that specific Annex, after consultation with such Vendor

Member(s) as is appropriate for that industry-specific Annex. Service Provider Signatories not covered by a particular industry-specific Annex may not prevent amendment of that Annex.

11.6. Any Member may raise with the Steering Committee any concerns that an amendment to an industry-specific annex is inconsistent with the purpose of this Voluntary Agreement and may require further amendments to the Voluntary Agreement.

11.7. Once an amendment to the Voluntary Agreement has been adopted by the Steering Committee the Voluntary Agreement will be amended with the newly adopted amendment taking effect on the next anniversary of the Effective Date or such other date as may be adopted with the amendment.

12. Non-Compliance and Dispute Resolution

12.1. Substantial compliance with the Voluntary Agreement shall be assessed by the Independent Administrator based upon data for the most recently completed Reporting Period on the basis of the information provided by each Signatory.

12.2. In mitigation of any claims or concerns raised with respect to any Reporting Period and in evaluating substantial compliance with the Voluntary Agreement, a Service Provider shall be credited for alternative energy efficiency steps which provide energy efficiency gains superior to those required by the Voluntary Agreement. Such efforts may include but are not limited to: (a) using home networking and multi-room solutions to share the resources of a primary device with lower-functionality home-networked devices; (b) moving Set-Top Box recording, other functionality, or applications into the network or cloud; (c) delivering video services via Internet Protocol (IP) without the need for a Set-Top Box, using digital transport adapters, or using other adapters in lieu of Set-Top Boxes; (d) achievement of greater energy efficiency in Set-Top Boxes than is required by the Voluntary Agreement; (e) achievement of energy efficiency targets in Set-Top Boxes earlier than the required schedule. The Steering Committee may adopt procedures for evaluating such alternative energy efficiency steps.

12.3. The Steering Committee may raise a claim against a Signatory concerning compliance with the Voluntary Agreement.

12.4. The Steering Committee will establish dispute and compliance resolution procedures that provide notice of a claim to the Signatory, and shall endeavor in good faith to resolve the issue within three (3) months through consultation.

12.5. A Signatory that is found by the Independent Administrator not in substantial compliance with the Voluntary Agreement after being credited for alternative energy efficiency steps, if any, shall be provided a period of three (3) months from the date of its receipt of the notice described in Section 12.4 to or provide a satisfactory remedial plan to the Steering Committee. A Signatory that fails to do so and to fulfill its remedial plan may have its Signatory status terminated by the Steering Committee and its termination reported to such persons as the Chair may deem appropriate.

12.6. Involuntary termination pursuant to this Section constitutes the sole and complete remedy available to the Steering Committee, Signatories, Independent Administrator, auditor or any third party or other individuals or entities with respect to any alleged noncompliance with any term, provision or obligation of the Voluntary Agreement by a Signatory.

13. Termination

13.1. Any Signatory may elect to terminate its Signatory status by giving twenty-eight days' written notice to the Chair of the Steering Committee. Such termination shall immediately terminate all of that Signatory's rights and obligations under the Voluntary Agreement except that all

confidentiality obligations arising from this Voluntary Agreement shall survive such termination.

13.2. The Chair will notify all Members of the Steering Committee and such other persons as the Chair may deem appropriate of the termination.

14. Term

14.1. The term of this Voluntary Agreement shall begin on January 1, 2013 and shall continue for five (5) years.

14.2. The Voluntary Agreement may be renewed by mutual agreement.

15. Miscellaneous

15.1. Press. A Signatory may make public statements or issue press releases in relation to the Voluntary Agreement generally and its own compliance and/or engagement with the Voluntary Agreement. Except as expressly provided in this Voluntary Agreement, neither the Steering Committee nor any Signatory may make public statements or issue press releases making reference to another Signatory's compliance and/or engagement with the Voluntary Agreement (directly or by inference), except for: (1) statements made with prior approval of that other Signatory; and (2) comparative product information; provided that no statements may make use of or reveal confidential information.

15.2. Force Majeure. If a Signatory is prevented or delayed in performance of its commitments hereunder as a result of circumstances beyond such Signatory's reasonable control, including, without limitation, Acts of God, war, terrorism, acts of the government, or failure of suppliers, subcontractors, or carriers, such failure or delay will not be deemed to constitute substantial noncompliance with this Voluntary Agreement, but such commitments will remain in full force and effect, and will be performed or satisfied as soon as reasonably practicable after the termination of the relevant circumstances causing such failure or delay.

15.3. Counterparts. This Voluntary Agreement may be executed in one or more counterparts, each of which when so executed and delivered shall be an original and all of which together shall constitute one and the same instrument. Signatures to this Voluntary Agreement may be delivered by facsimile, which, upon delivery, shall be deemed to be originals.

15.4. Legal Effect. The Voluntary Agreement sets out a course of action for the Signatories to improve the energy efficiency of Set-Top Boxes. The Voluntary Agreement is not a commercial agreement and does not in itself create any contractual relationship, partnership, joint venture or other agency relationship among the Signatories. Nothing in this Voluntary Agreement shall be deemed to create a third-party beneficiary relationship.

15.5. Notice. All communications to Signatories in relation to the Voluntary Agreement should be addressed and sent to the relevant contact point specified in Annex 9.

SCHEDULE OF ANNEXES

ANNEX 1 – GENERAL DEFINITIONS

ANNEX 2 – REPORTING PRO-FORMA

ANNEX 3 – CABLE INDUSTRY PROVISIONS

ANNEX 4A – IPTV PLATFORM PROVISIONS (AT&T and CenturyLink)

ANNEX 4B – VERIZON PLATFORM PROVISIONS (Verizon)

ANNEX 5 – SATELLITE INDUSTRY PROVISIONS

ANNEX 6 – TEST METHOD

ANNEX 7, Part A – SERVICE PROVIDER SIGNING FORMS

ANNEX 7, Part B – EQUIPMENT MANUFACTURERS, SOFTWARE PROVIDERS, CONDITIONAL ACCESS PROVIDERS, COMPONENT MANUFACTURERS SIGNING FORMS

ANNEX 8 – ANNUAL REPORT

ANNEX 9 – CONTACT INFORMATION

ANNEX 1 – GENERAL DEFINITIONS

1. "Component Manufacturer" means a company or other legal entity that is responsible for designing and manufacturing components that will be used by a second company to build a product.
2. "Conditional Access" means the encryption, decryption, and authorization techniques employed to make access to content conditional upon authorization using a key that is dynamically allocated using a conditional access (CA) or Digital Rights Management (DRM) system.
3. "Conditional Access Provider" means a company that supplies the Conditional Access techniques employed to protect content from unauthorized viewing.
4. "Effective Date" means January 1, 2013, except that as applied to a Signatory that signs the Voluntary Agreement after that date, it shall mean the date on which that party signs the Voluntary Agreement.
5. "End User" means a subscriber to content services provided by a Service Provider who uses a Set-Top Box provided by the Service Provider as part of the subscription.
6. "Equipment Manufacturer" means the company or other legal entity that is responsible for designing, developing and/or manufacturing a Set-Top Box for purchase and deployment in the United States by a Service Provider.
7. "Equipment Under Test" or "EUT" means the equipment being tested.
8. "Federal" includes any part of the government of United States and any department, agency or instrument thereof.
9. "Independent Administrator" means the party designated by the Steering Committee who is tasked with, and responsible for, the collection and processing of information supplied directly or indirectly by Signatories pursuant to Section 7 and Annex 2, and determining a Signatory's compliance with the Voluntary Agreement in accordance with Section 12. The Steering Committee shall engage the services of an Independent Administrator upon terms and conditions that shall require undertakings of confidentiality from the Independent Administrator, and which shall also set out any requirements or applicable mechanisms for a process of appeal, should this ever be necessary.
10. "Members" means the Members of the Steering Committee.
11. "Reporting Period" means the period within which the required information is to be submitted by a Signatory (which is generally a calendar year).
12. "Service Provider" means an entity that provides video (and possibly other) content to subscribers with whom it has an ongoing contractual relationship through a cable, satellite, or other managed distribution network provided by that entity. A Service Provider in the context of the Voluntary Agreement is one that supplies Set-Top Boxes to a residential End User.
13. "Set-Top Box" means a device which is capable of receiving digital television services from a coaxial, hybrid fiber coaxial, or fiber-to-the-home distribution system, from satellites, or encapsulated in IP packets from managed IP distribution networks; to decrypt or descramble these signals; and to decode/decompress for delivery to a single residential consumer display and/or recording device, and/or one or more other Set-Top Boxes or Thin Clients in a residential multi-room architecture, and that is purchased and placed into service in the United States by a Service Provider for the first time on or after the Effective Date. The Set-Top Boxes subject to this Voluntary Agreement are limited to the following Set-Top Boxes supplied by Service Providers to residential End Users:

a. DVR. A Set-Top Box that has the capability of storing digital video signals received from the network to a rewritable disk drive or other non-volatile storage media local to the unit.

b. Non-DVR. A Set-Top Box that does not have the capability of storing digital video signals received from the network.

c. Thin Client. A Set-Top Box that is designed to interface between another Set-Top Box and a TV (or other display device) over a home network and relies solely on the other Set-Top Box for access to digital video signals received from the network. Any Set-Top Box that meets the definition of DVR or Non-DVR is not a Thin Client.

Set-Top Boxes subject to this Voluntary Agreement do not include:

d. Any Set-Top Box that is purchased for the first time before the Effective Date, including any such Set-Top Box that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed, or that is used in a "swap-for-failure" scenario after the Effective Date.

e. Any Multi-service Gateway, which for purposes of this Voluntary Agreement is a device that is capable of joining multiple Service Provider delivery protocols or provisioning at least two of video, voice, or broadband services from a Service Provider.

14. "Signatory" and "Signatories" mean those companies or organizations that sign this Voluntary Agreement as Service Providers or Vendor Signatories.

15. "Software Provider" means a company or other legal entity that is responsible for producing the middleware and/or the operational software for the Set-Top Box.

16. "State" includes the governments of the District of Columbia and any State, territory and insular possession of the United States and their political subdivisions; and any agency or instrument thereof.

17. "Steering Committee" means the coordinating and governing body of this Voluntary Agreement.

18. "Vendor Signatory" means the Equipment Manufacturers, Software Providers, Conditional Access Providers, Component Manufacturers that are Signatories pursuant to ANNEX 7, Part B – Equipment Manufacturers, Software Providers, Conditional Access Providers, Component Manufacturers Signing Forms.

ANNEX 2 – REPORTING PRO-FORMA

Information to be provided by Service Provider Signatories

Name of the Service Provider Signatory	
Reporting Period to which the information relates	
New Set-Top Box model type(s) procured by the Service Provider during the Reporting Period	
New Set-Top Box model type(s) procured by the Service Provider during the Reporting Period that meet the requirements of § 3	
ENERGY STAR Version 3.0 TEC figures in the Reporting Period per Set-Top Box model.	
List Features Deactivated for Testing Pursuant to § 6.3	
Reduction in TEC Reported Attributable to Features Excluded Pursuant to § 6.4 (documentation must be attached)	
Optional: information concerning alternative energy efficiency steps which the Service Provider wishes to be considered under § 12.2	

Category of Set-Top Box means, for the purposes of reporting under this Annex, a DVR, Non-DVR, and Thin Client.

Reporting format may be conformed to the format required by ENERGY STAR.

All Section (§) references above are to the Voluntary Agreement.

ANNEX 3 - CABLE INDUSTRY PROVISIONS

1. Signatories

1.1. The detailed commitments set forth in this Cable Industry Annex have been subscribed to by Comcast Cable Communications, LLC, Time Warner Cable, Inc., Cox Communications, Inc., Charter Communications, Inc., Cablevision Systems Corp., and Bright House Networks, LLC ("Cable Operators"). The Cable Operators are the largest Service Provider member companies of the National Cable & Telecommunications Association (NCTA) who serve approximately 85% of cable subscribers. Key vendors to the cable industry, identified in ANNEX 7, Part B, are also Signatories in support of the Voluntary Agreement.

2. Phase 1: Sleep

2.1. The Voluntary Agreement does not have any effect on previously deployed equipment. The Cable Operators nonetheless specifically commit to go beyond this general principle. The Cable Operators will continue the deployment which commenced in September 2012 of new Set-Top Boxes with "light sleep" capabilities while still preserving their functionality and of software updates enabling "light sleep" to certain models of deployed DVRs that have been placed in service prior to the Effective Date and are capable with commercially reasonable efforts of implementing "light sleep."

2.2. "Light Sleep" means the capability of reducing energy consumption by the Set-Top Box during extended periods of inactivity or at specific times. Normative settings should put the Set-Top Box into sleep mode after no more than 4 hours of inactivity (i.e., no user input or programmed event in process), and to place the Set-Top Box back into sleep mode no more than 15 minutes after concluding an automatic function that does not require user input (e.g. download, programmed recording). The Cable Operators may vary these settings in order to provide a good customer experience. The Cable Operators may also provide customers with tools to vary or opt-out from these settings.

3. Phase 2: Procurement

3.1. Each Cable Operator will ensure that 90% of all new Set-Top Boxes it purchases and deploys after December 31, 2013 shall meet the efficiency standards for ENERGY STAR Version 3.0 devices, with "Light Sleep" enabled in capable DVR models.

3.2. The Cable Operators will provide reports of 2013 procurements pursuant to the Annual Report provided for in the Voluntary Agreement.

4. Phase 3: Power Scaling

4.1. Development. The Cable Operators will work with their suppliers to develop next generation semiconductors and specifications for new model Set-Top Boxes allowing 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 the ability for the Set-Top Box to wake for periodic updates or record pre-scheduled shows.

4.2. Field Testing. The Cable Operators will commence field tests of Set-Top Boxes that include next generation power management (herein referred to as Next Generation Set-Top Boxes) by December 31, 2014.

4.3. Deployment. If a Next Generation Set-Top Box has been field tested and it successfully performs on a Cable Operator's network, the embedded next generation System-on-a-Chip supports all of a Cable Operator's services, and utilization of that Next Generation Set-Top Box is economically feasible, then the Cable Operator will begin deployment of that Next Generation

Set-Top Box in its ordinary set-top box replacement cycle. The parties anticipate deployment of such successfully tested Next Generation Set-Top Boxes during 2016.

5. Testing

5.1. Testing methods to determine energy use and compliance beyond ENERGY STAR Version 3.0 shall be performed as provided in Annex 6.

5.2. Cable Television Laboratories, Inc. (CableLabs) and the Cable Operators' test facilities operating under CableLabs' guidance are specifically approved as test facilities for these purposes.

5.3. Cable Operators may utilize qualified vendor test facilities for testing purposes.

ANNEX 4A - IPTV PLATFORM PROVISIONS

1. Signatories

1.1. The detailed commitments set forth in this IPTV platform Annex have been subscribed to by AT&T Services, Inc., and CenturyTel Broadband Services, LLC d/b/a CenturyLink.

2. Accommodation of New Features Not Addressed by Energy Star Version 3

2.1. Because of the rapid pace of innovation, Energy Star Version 3 functionality allowances and/or testing methodology may not address all features present in Set-Top Boxes covered by the Voluntary Agreement. To the extent newly introduced features cannot be disabled for testing, as contemplated in paragraph 6.3 of the Voluntary Agreement, the Service Provider, after consultation with the appropriate manufacturer, will specify an energy consumption allowance to account for the new feature. The Service Provider will document and disclose the process used to quantify this allowance, subject to appropriate protections for proprietary and competitively sensitive information.

2.2. The Service Provider will use reasonable diligence to establish an energy consumption allowance for Set-Top Box features not addressed by Energy Star Version 3. However, consistent with this agreement's emphasis on rapid innovation and protecting the customer experience, the absence of such an allowance will not delay the deployment of devices carrying the new feature. Nor will a reasonable delay in establishing such an allowance count against a Service Provider in determining compliance with its deployment commitments under this Voluntary Agreement.

3. Light Sleep and Whole-Home Features in DVR Set-Top Boxes

3.1. When deploying DVR Set-Top Boxes, the Service Providers adopting this annex commit to provide units incorporating software instructions that automatically direct the disk drive to stop spinning during periods of disk inactivity, consistent with preserving the customer experience and disk life. The Service Providers covered by this annex agree to continue to provide this light sleep feature on all DVR Set-Top Boxes newly purchased and deployed after the date of adoption of this voluntary agreement.

3.2. To the extent DVR Set-Top Boxes are deployed, the Service Providers adopting this annex commit to deploying whole-home DVR Set-Top Boxes, rather than multiple in-home DVR Set-Top Boxes. Whole-home DVR Set-Top Boxes can effectively and efficiently serve content to multiple remote or client devices within a consumer's home. Having a single, whole-home DVR Set-Top Box serving video content in this manner typically consumes significantly less energy than do configurations involving multiple DVR Set-Top Boxes throughout the home.

4. Reduction of Inactive State Energy Consumption

4.1. The Service Providers adopting this annex are committed to pursuing innovative and commercially reasonable strategies (including deep sleep) to further reduce the energy consumption of their Set-Top Boxes, particularly when those boxes are not active. In pursuing these strategies, the Service Providers must weigh the potential for energy savings against the potential for adverse customer experience.

4.1.1. The Service Providers covered by this annex commit to evaluate the options for further reducing inactive-state energy consumption while not degrading the customer experience.

4.1.2. The Service Providers commit to providing periodic updates to government and energy-advocate stakeholders on: (1) the steps considered to further reduce their Set-Top Boxes' energy consumption and (2) the technological and customer-experience issues that must be addressed to enable achievement of this goal.

ANNEX 4B - VERIZON PLATFORM PROVISIONS

1. The detailed commitments set forth in this annex have been subscribed to by Verizon and relate to its FiOS TV service.

2. Verizon intends to achieve the commitments with respect to Set-Top Box purchases and deployment after December 31, 2013 consistent with Section 3 of the Voluntary Agreement. Consistent with Section 6.3 of the Voluntary Agreement, new features or functions which consume significant power and are not covered by Energy Star Version 3.0 will not to be counted against the initial efficiency targets.

3. Verizon will enable "light sleep" capabilities in certain models of Set-Top Boxes that are newly purchased and deployed after January 1, 2013, while not degrading the customer experience.

4. Verizon will set a default value of four hours of inactivity, although it may vary particular settings as needed to provide a good customer experience and/or to program sleep at a specific time.

5. Verizon commits to pursuing innovative and commercially reasonable strategies (including deep sleep) to continually reduce the energy consumption of its Set-Top Boxes, particularly when those boxes are not active. In pursuing these strategies, Verizon will weigh the potential for energy savings against the potential for adverse customer experience while not degrading the customer experience.

6. Verizon commits to offering and deploying Whole Home servers and clients, as appropriate, for its customers' residential configurations, in 2013.

ANNEX 5 - SATELLITE INDUSTRY PROVISIONS

In addition to the energy efficiency commitments outlined in Section 3 (Service Provider Commitments for Set-Top Boxes), Satellite Service Provider signatories commit to:

1. Effective January 1, 2013, (the calendar year 2013 reporting period), at least 90% of new Set-Top Boxes purchased will include an "Automatic Power Down" (APD) feature with a default value of 4 hours or less.

2. Effective January 1, 2013 (the calendar year 2013 reporting period), energy efficient Whole-Home Servers and Clients will be available to all new and existing subscribers.

3. By the end of 2013 (for the calendar year 2014 reporting period), at least 90% of all new Set-Top Boxes purchased, including Whole-Home DVR Set-Top Boxes, will meet ENERGY STAR Version 3.0.

ANNEX 6 – TEST METHOD

The Signatories plan to follow test methodologies and procedures described in the 10/24/12 Draft *CEA-2043: Set-top Box (STB) Power Measurement* standard developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee.

The Steering Committee may amend and update this Annex under the procedures of Section 11.

ANNEX 7, Part A – SERVICE PROVIDER SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 3 – CABLE INDUSTRY PROVISIONS.

Bright House Networks, LLC

Signature: /s/ Jeff Chen
Name: Jeff Chen
Title: SVP, Advanced Technology
Date: November 30, 2012

Cablevision Systems Corp.

Signature: /s/ Yvette Kanouff
Name: Yvette Kanouff
Title: EVP – Corporate Engineering & Technology
Date: November 30, 2012

Charter Communications, Inc.

Signature: /s/ Jay Rolls
Name: Jay Rolls
Title: SVP & CTO
Date: November 29, 2012

Comcast Cable Communications, LLC

Signature: /s/ Tony Werner
Name: Tony Werner
Title: EVP & CTO
Date: November 30, 2012

Cox Communications, Inc.

Signature: /s/ Kevin T. Hart
Name: Kevin T. Hart
Title: Executive Vice President & Chief Technology Officer
Date: November 29, 2012

Time Warner Cable Inc.

Signature: /s/ Mike LaJoie
Name: Mike LaJoie
Title: Chief Technology Officer
Date: November 28, 2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 4A – IPTV PLATFORM PROVISIONS.

AT&T Services, Inc.

Signature: /s/ Nolan Daines
Name: Nolan Daines
Title: SVP
Date: November 30, 2012

CenturyTel Broadband Services, LLC d/b/a CenturyLink

Signature: /s/ Matt Beal
Name: Matt Beal
Title: SVP Corporate Strategy/Product Development & CTO
Date: November 30, 2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 4B – VERIZON PLATFORM PROVISIONS (Verizon).

Verizon Communications, Inc.

Signature: /s/ James J Gowen
Name: James J Gowen
Title: Vice President Supply Chain Operations / Chief Sustainability Officer
Date: 11/30/2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 5 – SATELLITE INDUSTRY PROVISIONS.

DirecTV, LLC

Signature: /s/ Rômulo Pontual
Name: Rômulo Pontual
Title: EVP and CTO
Date: November 30, 2012

DISH Network LLC

Signature: /s/ Stanton Dodge
Name: Stanton Dodge
Title: EVP & General Counsel
Date: November 30, 2012

ANNEX 7, Part B – EQUIPMENT MANUFACTURERS, SOFTWARE PROVIDERS, CONDITIONAL ACCESS PROVIDERS, COMPONENT MANUFACTURERS SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement.

Cisco Systems, Inc.

Signature: /s/Joe Chow
Name: Joe Chow
Title: VP/GM, Connected Devices
Service Provider Video Technology Group
Date: November 29, 2012

Motorola Mobility LLC

Signature: /s/ Marwan Fawaz
Name: Marwan Fawaz
Title: Executive Vice President
Date: November 28, 2012

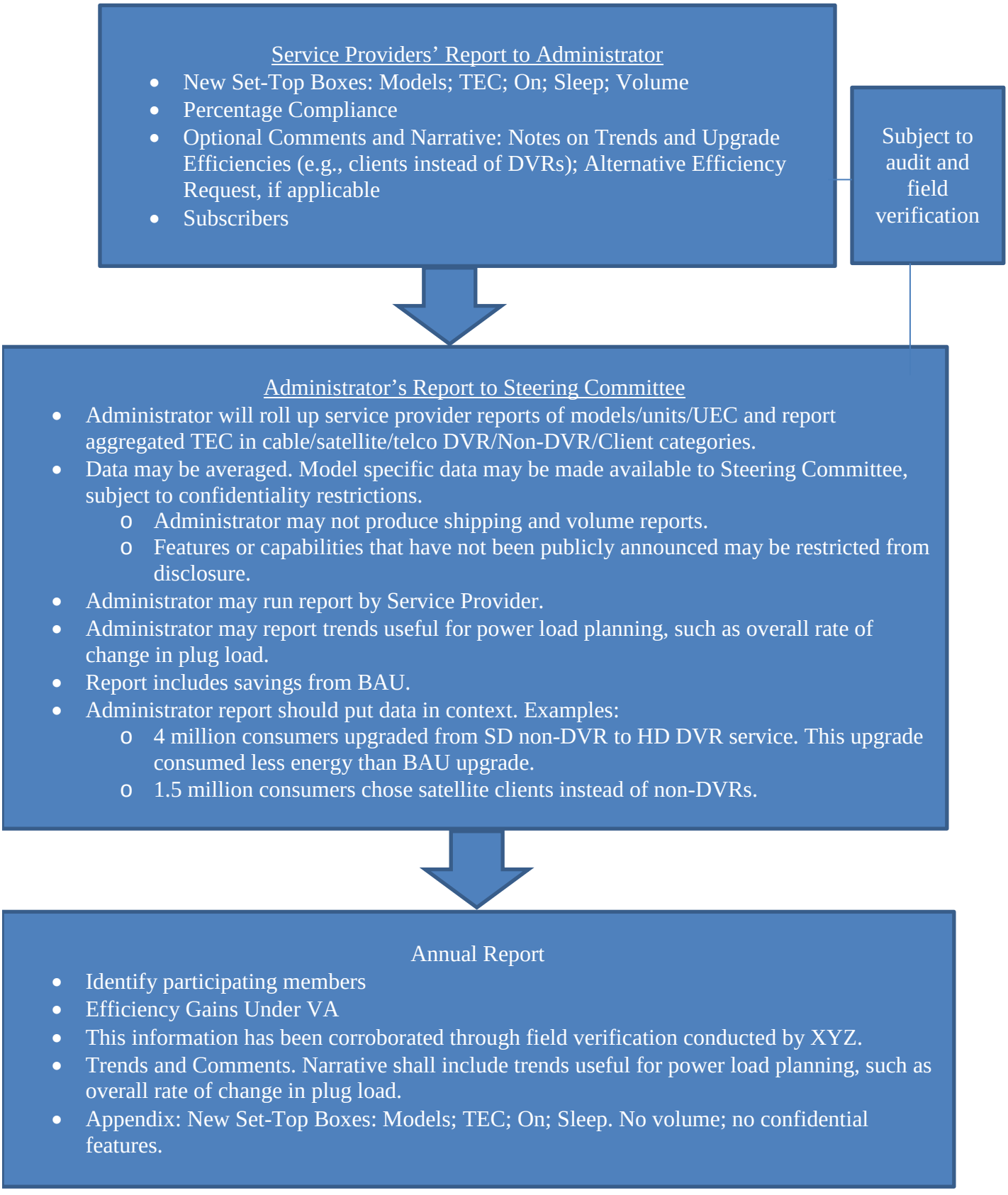
ARRIS Group, Inc.

Signature: /s/ Lawrence A. Margolis
Name: Lawrence A. Margolis
Title: EVP and Chief Counsel
Date: November 28, 2012

EchoStar Technologies LLC

Signature: /s/ Mark Jackson
Name: Mark Jackson
Title: President
Date: November 29, 2012

ANNEX 8 – ANNUAL REPORT



ANNEX 9 – CONTACT INFORMATION

REDACTED